U.S. Army Research, Development, and Engineering Command

Armament Research Development and Engineering Center (RDECOM-ARDEC)

Environmental Assessment
Soft Recovery Systems
Picatinny Arsenal, New Jersey

Prepared for:
U.S. Army Corps of Engineers
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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

Soft Recovery System
U.S. Army Research, Development, and Engineering Command
Armament Research, Development and Engineering Center
(RDECOM-ARDEC)

FINDING OF NO SIGNIFICANT IMPACT
February 2004

Description of Propose Action and Alternatives Considered

The Proposed Action for which an Environmental Assessment (EA) has been prepared, resulting in this Finding of No Significant Impact (FNSI) is the construction and operation of five (5) Soft Recovery Systems in the 600 Area of the Picatinny Arsenal. The system will be composed of the following rail guns mounted on steel rails and supported with concrete piers:

Gun Caliber	Type	Length
105 mm	Cannon Scat Gun	100m (30 ft.)
120 mm	Cannon Scat Gun	TBD
120 mm	Mortar Scat Gun	TBD
127 mm	Cannon Scat Gun	TBD
155 mm	Variant Scat Gun	180m (540 ft.)

All five guns will be constructed parallel within a footprint occupying approximately 200 meters long by 50 meters wide by three (3) meters tall. Additional site support facilities will consist of refurbishing an existing bunker for use as a Bunker/Instrumentation Shed, construction of a parking lot for eight (8) vehicles, and installation of a septic system. The support facilities will occupy an additional footprint of approximately 50 meters long by 50 meters wide. The Proposed Action is currently at the 80 percent concept design stage.

Facts and Conclusions Leading to the FNSI

All elements of the Proposed Action have been evaluated in this EA in order to identify expected or potential environmental effects. No significant adverse environmental impacts have been identified, nor have conflicts with land use, policies or controls been observed, as confirmed by the Public Works Directorate of the Picatinny Arsenal.

It is the conclusion of this EA that the Proposed Action will not have a significant impact on the environment and therefore, it will not be the subject of an Environmental Impact Statement (EIS). As a result, this FNSI has been prepared.

For further details, please refer to the text and/or figures in the EA.

Public Comment Period

The deadline for the general public to comment on this project or to submit requests for further information is 30 days from the date of public notification of this FNSI. The U.S. Army point of contact is Mr. Pete Rowland, External Affairs, AMSTA-AR-AO, Building 1, Picatinny Arsenal, Picatinny, New Jersey, 07806-5000, (973) 724-7243.

1.0 INTRODUCTION

This document, together with its appendices and incorporations by reference, constitutes an Environmental Assessment (EA) pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended. NEPA regulations require the preparation of an assessment of potential direct and/or indirect adverse environmental effects that may be encountered through any proposed action that constitutes a "major federal action".

This EA, the assessment it presents, and the procedures by which the environmental investigations are conducted and incorporated in decision-making are integral parts of a process established by NEPA to ensure that the environmental consequences of federal projects are adequately taken into account. The process is designed to ensure that public officials make decisions based on a complete understanding of the environmental impacts of proposed actions and take all appropriate steps to "*protect, restore, and enhance the environment*" (40 CFR 1501.7).

The purpose of this document is to present an assessment of the potential environmental consequences that may result from the construction of a proposed Soft Recovery System at the United States Army Research, Development, and Engineering Command-Armament Research, Development and Engineering Center (RDECOM-ARDEC), located at Picatinny Arsenal, New Jersey. The Soft Recovery System Project includes the proposed construction and operation of a 105 mm Cannon Scat Gun, 120 mm Cannon Scat Gun, 120 mm Mortar Scat Gun, 127 mm Cannon Scat Gun, 155 mm Variant Scat Gun, refurbishing an existing bunker for use as a Firing Bunker and Instrumentation Shed for the guns, a septic system, and a parking area within the B640 site. This activity will be referred to hereafter as the Proposed Action.

This EA examines the effects that the Proposed Action would have on the environment and the significance of these effects based on information that is currently available. Should any potential design issues become evident that are not resolved herein, Picatinny Arsenal will assess the issue according to the standard internal procedure for Records of Environmental Considerations (REC) and submit such documents as required at each design phase. This EA will be revisited per NEPA requirements and revised as more information becomes available.

Topics discussed in this EA include:

- Purpose and Need for the Proposed Action;
- Description of the Proposed Action;
- Alternatives Considered;
- Affected (or Existing) Environment; and
- Environmental Impact of the Proposed Action.

2.0 PURPOSE AND NEED

2.1 Background

The Picatinny Arsenal (Arsenal) is located in Rockaway Township, Morris County, New Jersey, and is situated approximately 30 miles northwest of Newark, New Jersey and 40 miles west of New York City (Figure 2-1). The installation is largely located in Rockaway Township with the western portion of the installation located in Jefferson Township, Morris County, New Jersey. The Arsenal is approximately five miles long and one and one-half miles wide and encompasses an area of approximately 6,500 acres. The facility is residence to the Armament Research, Development and Engineering Center (ARDEC) and the administrative jurisdiction is the responsibility of the U.S. Army Research, Development and Engineering Command (RDECOM). In addition to ARDEC, the Arsenal is comprised of several other Department of Defense (DOD) tenant organizations and numerous private contractors.

ARDEC's mission has remained unchanged since 1986 and is outlined by the following objectives:

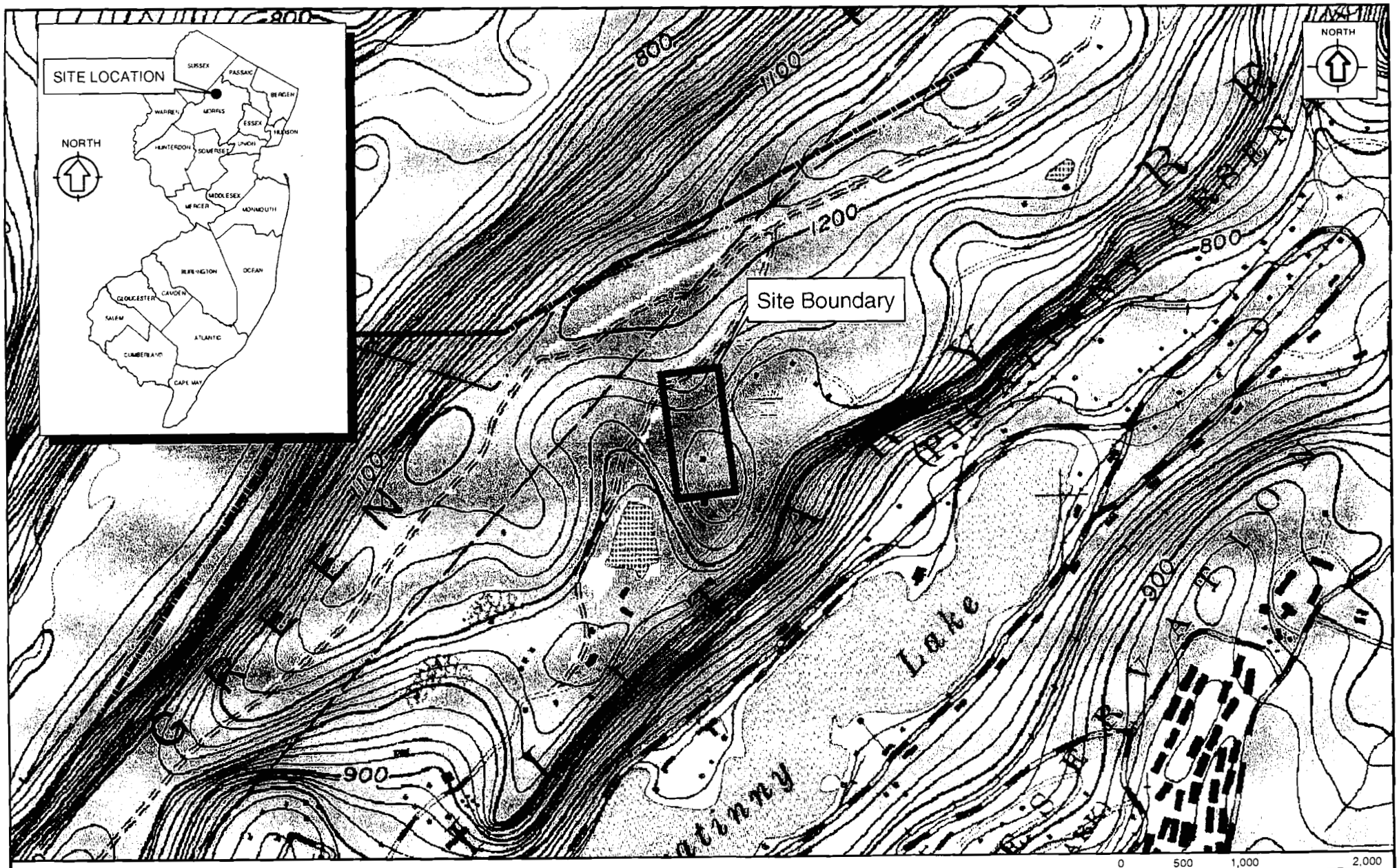
- Conduct development and product improvements to weaponry and weapons systems;
- Maintain a strong technological base in government, industry, and universities in order to develop improved products and prevent technological mishap;
- Support production and field testing; and
- Provide life-cycle, technical support to U.S. soldiers in the field.

Currently, buildings and various man-made structures on the Arsenal are dedicated for mission effectiveness and completeness. Buildings include administrative offices, housing facilities, ordnance facilities, and laboratories dedicated to research and development. A substantial number of structures are vacant and more are being vacated as the number of personnel at the Arsenal continues to decrease.

2.2 Proposed Action

2.2.1 Description

This Environmental Assessment (EA) has been prepared to address the Soft Recovery System Project. This project includes the proposed construction and operation of five new Soft Recovery Systems, refurbishment of an existing bunker for use as a Firing Bunker/Instrumentation Shed, a septic system, and a parking area. The facility would be occupied by approximately five (5) employees necessary to operate the Soft Recovery System and maintain normal operations. The frequency and operation of the system would be sporadic, as customer need arises. During periods of normal operation, the system would fire and recover approximately 200 rounds per year. The Soft Recovery System Project is being proposed to replace the existing, obsolete Rail Gun System located in the 3620 area of the Arsenal. The 3620 area will remain open until the Soft Recovery System is operational. Once operational, the 3620 area will be properly closed and



Source: USGS 7.5 minute Topographic Quadrangle, Dover, NJ.

U.S. Army Corps of Engineers
New York District

Environmental Assessment for the
Ballistic Rail Gun System

Location Map

FIGURE 2-1

addressed under a separate environmental action. The new system will consist of versatile rail guns with barrel lengths from 100 to 180 meters (300 to 540 feet), supporting the new munitions and their associated payloads, fuses, etc., whereas the existing system is limited to older munitions with a barrel length of only 30 meters (100 feet). The Soft Recovery System Project is proposed within the B640 site, located within the Robinson Gate enclosure off of Bear Swamp Road, approximately 245 meters (800 feet) northeast of the intersection of Bear Swamp Road and 20th Road (Figure 2-2). The B640 site was selected as the location of the Soft Recovery System Project due to its preferable landscape position which offers a more secluded location from other activity sites, provides a natural termination point (i.e. adjacent slopes), and will better attenuate noise during operation. The proposed site meets safety clearance requirements of 100 meters (330 feet) from a public road, 170 meters (550 feet) from an inhabited building, and 60 meters (200 feet) intraline distance to a similar operation. The site has also been partially disturbed by previous Arsenal-related research activities and is within the restricted access region of the Arsenal.

The B640 study area is approximately 4 hectares (10 acres) in size and the Soft Recovery Systems and ancillary facilities are anticipated to have a combined footprint of disturbance of approximately 13,000 square meters (140,000 square feet) or 1.3 hectares (3.2 acres) (Figure 2-2). The proposed Soft Recovery Systems will consist of five parallel steel rails, supported by concrete piers occupying a combined footprint of approximately 200 meters (656 feet) long by 50 meters (150 feet) wide and three (3) meters (10 feet) high. Approximately 95 to 175 meters of length would be dedicated to pressurized tubes and/or other "braking" methods. A parking area, Bunker/Instrumentation Shed, and a septic system would occupy an additional area measuring approximately 50 meters by 50 meters (150 feet by 150 feet).

Heating and air conditioning for this project would be provided by a self-contained system, (i.e. electric heat and air conditioning). Water requirements for the Soft Recovery System are estimated at 30 gallons per day (gpd). This water will be used for deceleration of projectiles. Also, a septic system (single toilet) with a maximum capacity of 100 gpd will be installed. Electrical power requirements are estimated to be less than 5 megawatt hour (mwh) a year and would be provided by an outside utility company, Jersey Central Power & Light (JCP&L). There will be no discharges of wastewater from this facility to the Rockaway Valley Regional Sewerage system. All of the above utility requirements can be supplied by the existing infrastructure system in place at the Arsenal. Sufficient utility lines to support the Rail Guns are already in place to support existing equipment. With the exception of the septic system, no additional connections for drinking water or sewer systems are expected.

Tree clearing will be conducted between November 15 and April 1 in order to avoid impacts associated with potential Indiana Bat habitat. Construction is scheduled to commence in August 2004 and be completed by December 2004. Operation of the facility will commence shortly after construction completion. Construction work associated with the Proposed Action will be in accordance with DOD Construction Criteria, Applicable U.S. Army Corps of Engineers Guide Specifications, Occupational Safety and Health Administration (OSHA), and Environmental Protection Agency (EPA) standards.

2.2.2 Purpose and Need

The U.S. Army, RDECOM-ARDEC is responsible for developing and testing future weapons systems. The Proposed Action of constructing and operating a new Soft Recovery System directly

correlates with RDECOM-ARDEC's mission. Should the Proposed Action not be approved, the result would be a negative impact on the ability of the U.S. Army, RDECOM-ARDEC to perform its mission and would also jeopardize the testing of future weapon systems. Such a system is needed to ensure that current and future precision munitions are afforded the highest levels of engineering excellence, quality, and consistency when they are evaluated. Without such a system the development and evaluation of new munitions would be hampered, by a lack of accurate, timely available data.

A new Soft Recovery System is needed at the Arsenal to replace the existing, obsolete Rail Gun System located in the 3620 area. The new Soft Recovery Systems would provide RDECOM-ARDEC with a new, state-of-the-art system for evaluating acceleration effects on munitions up to 155 mm and unicharge rounds. The Soft Recovery Systems are designed to test the following propellant charges:

- M3A1 (zones 1-2) M1
- M4A2 (zones4-7) M1
- M119A2 M6
- M203A1 M31
- M321 (zones 1-6) M30A1
- M232 (zones 1-6) M30A1
- M67 (M1 Propellant)
- 120 mm Mortar

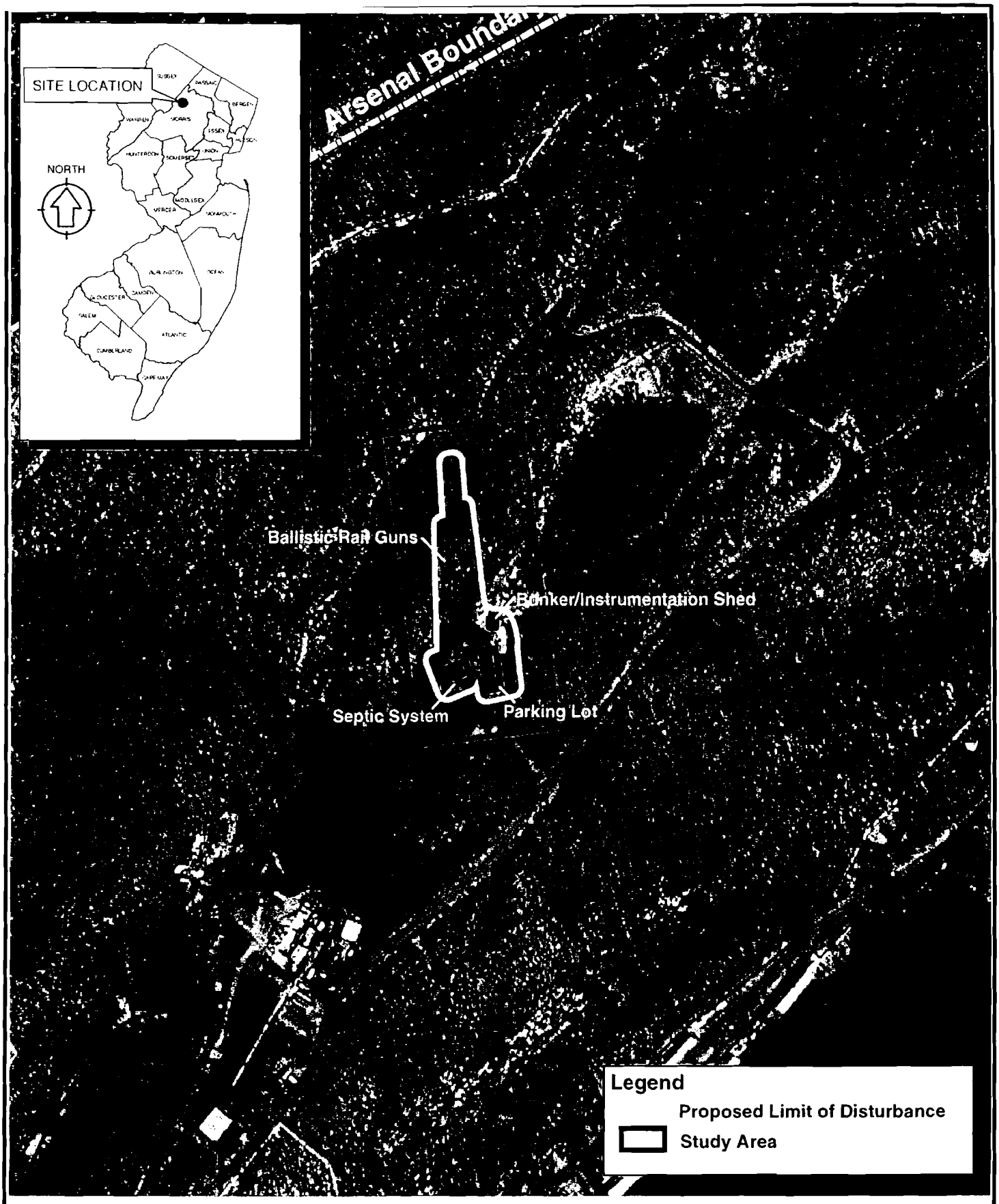
The new system will be able to test the newer 105 mm, 120 mm, and 155 mm howitzers and their munitions.

The proposed Soft Recovery System would possess the following capabilities that the existing Rail Gun System does not provide. These additional capabilities demonstrate a need to development, construct, and operate the new Soft Recovery System.

The new Soft Recovery System will:

- Be capable of imparting modern cannon design environments;
- Allow for softer projectile recovery;
- Allow for 20,000 "g" acceleration;
- Monitor pressure versus time history;
- Evaluate electronics, fuses, and payload;
- Possess higher operating pressures (80,000 lb./in.^{2}); and
- Possess higher projectile spin rates (16,000 rpm).
- Reduced balloting loads during deceleration.

Additional upgrades of the new Soft Recovery System compared to the existing Rail Gun System include improved structural integrity and an integrated 180-meter rail, which will constitute an upgrade from the existing 30-meter rail.



Source: NJDEP Digital Orthophoto, Dover-NE, 1995/1997.

U.S. Army Corps of Engineers New York District	DRAFT ENVIRONMENTAL ASSESSMENT BALLISTIC RAIL GUN SYSTEM PICATINNY ARSENAL **PREFERRED ALTERNATIVE (B640) SITE**	The Louis Berger Group, Inc. 30 Vreeland Road Florham Park, NJ	FIGURE 2-2

2.3 Scope of Environmental Analysis

As required by the National Environmental Policy Act (NEPA) of 1969 and Army Regulation (AR) 200-2, the environmental analysis in this EA includes: a description of the proposed action; the existing environment of the preferred alternative; environmental impacts or consequences of the proposed action and mitigative measures required; a determination of regulatory permits and approvals required for implementation of the proposed project; a listing of agencies and persons consulted; and a conclusion of finding on whether the environmental impacts are significant.

2.4 Applicable Regulatory Requirements and Coordination

Several federal, state, and local regulatory requirements must be followed and adhered to throughout the design, construction, and implementation of the proposed Soft Recovery System. Table 2-1 lists potentially applicable environmental compliance regulations. Additional State of New Jersey and Morris County regulations and/or ordinances developed under these various laws may also be applicable. RDECOM-ARDEC and the U.S. Army Corps of Engineers will comply with applicable regulations.

TABLE 2-1
ENVIRONMENTAL COMPLIANCE REGULATIONS

Regulation	Description
Environmental Policy	
The National Environmental Policy Act of 1969 (42 United States Code [USC] 4321 et seq.)	Sets goals, establishes policies, and provides a means to prevent or eliminate impact to the environment.
DOD Directive 6050.1 (32 CFR Part 214)	Supplements the CEQ regulations promulgated under NEPA by establishing DOD policies and procedures.
Army Regulation (AR) 200-2	Establishes the Environmental Impact Analysis Process (EIAP) and the specific procedural requirements for Army implementation of NEPA.
Executive Order 11514, Protection Enhancement of Environmental Quality as amended by EO 11991	Determines policy for directing the U.S. in providing leadership and in preserving and enhancing the quality of the environment.
Air Quality	
Clean Air Act (CAA) (42 USC 7401 et seq., as amended)	Establishes federal policy to protect and enhance the quality of the Nation's air resources to protect human health and the environment.
Noise	
Noise Control Act of 1972 (PL 92-574), as amended by the Quiet Communities Act of 1978	Establishes a federal policy "to promote an environment free from noise harmful to public health or welfare" and identifies desirable noise levels for residential areas.
Water Quality	
Clean Water Act of 1977 and the Water Quality Act of 1987 (33 USC 1251 et seq., as amended)	Established federal authority to restore and preserve the chemical, physical, and biological character of the waters of the U.S. and, where attainable, to achieve a level of water quality that provides for the protection and propagation of fish, shellfish. Also refer to state regulations under Natural Resources that deal with wetlands and soil erosion.
Safe Drinking Water Act of 1974, as amended (42 USC 300f et seq.)	Authorizes EPA to regulate public drinking water supplies by establishing drinking water regulations, deregulating enforcement authority of drinking water standards to the state governments, and protecting drinking water supplies from the injection of wastes and other materials into wells.
AR- 420-46	The operative regulation for the management of water and sewage programs on federal installations.
Endangered Species Act (16 USC 1531-1543)	Requires federal agencies that authorize, fund, or carry out actions, to avoid jeopardizing the continued existence of endangered or threatened species or destroying or adversely modifying critical habitat.
EO 11990, Protection of Wetlands	Requires federal agencies to take action to avoid, to the extent practicable, the destruction, loss, or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands.
AR 200-3, Natural Resources – Land, Forest, and Wildlife Management	Sets forth responsibilities, policies, and procedures to use, manage, restore renewable natural resources on Army lands.
Stream Encroachment Permit Issuing Agency: NJDEP	Permit is required for the construction, installation or alteration of any structure or permanent fill along, in or across, the channel or flood plain of any watercourse. A permit is also required for any alteration of, or discharge into, the watercourse itself.
Freshwater Wetlands Act N.J.A.C. 7:7A Issuing Agency: NJDEP	Permits are required prior to engaging in a regulated activity in and adjacent to freshwater wetlands and associated transition areas. New Jersey was delegated Section 404 permitting authority from the USACE for freshwater wetlands.

TABLE 2-1 (CONTINUED)
ENVIRONMENTAL COMPLIANCE REGULATIONS

Regulation	Description
Soil Erosion Control Plan Issuing Agency: Morris County Soil Conservation District Submitting Agency: ARDEC Chapter 251-NJSA 4:24-39 et seq.	Requires municipalities and all other public agencies who must condition development project approvals upon local soil conservation district certification of a plan for soil erosion and sediment control. Certification is required for projects that disturb more than 5,000 sq. ft. of surface area of land. A Request for Authorization (RFA) for stormwater associated with construction is also required for areas of disturbance greater than five (5) acres. (The five acre requirement is expected to change to one (1) acre in the near future.)
Health and Safety/Hazardous Materials/Solid Wastes	
EO 12088, Federal Compliance with Pollution Control Standards	Directs federal agencies to comply with state and local laws and regulations concerning air, water, and noise pollution, and hazardous materials and substances to the same extent as any private party.
Resource Conservation and Recovery Act of 1976 (RCRA)(42 USC 6901), as amended by the Superfund Amendments and Reauthorization Act (SARA)(42 USC 9601 et seq.)	Provides EPA with the authority to inventory, investigate, and clean up uncontrolled or abandoned hazardous waste sites. CERCLA allows federal facilities to become lead sites. The Defense Environmental Restoration Act provides authority to the Army as a lead agency to inventory, investigate, and clean-up uncontrolled or abandoned sites.
New Jersey solid waste rules (NJAC 7:26-2.1; 7:26-2a and 2B)	Specifies the rules and regulations governing the disposal of non-hazardous solid waste unless specifically exempted NJAC 7:26-1.1.
Occupational Safety and Health Act of 1971	Created the Occupational Safety and Health Administration (OSHA) under the Department of Labor. The act grants the Secretary of Labor the authority to promulgate, modify, and revoke safety and health standards; to conduct inspections and investigations and issue citations, including penalties, to require employers to keep records of safety and health data; to petition the courts to restrain imminent danger situations; and to approve or reject state plans for programs under the Act.
AR 420-47, Solid Waste Management	Gives policies, procedures, and responsibilities of managing solid waste on Army Installations.
Cultural, Paleontological, and Archaeological Resources	
National Historic Preservation Act (NHPA) of 1966 (16 USC 470 et seq., as amended); the Historic Sites, Buildings and Antiquities Act, as amended; and the Archaeological and Historic Preservation Act.	Primary goals are to ensure adequate consideration of the values of historic properties in carrying out federal activities and to attempt to identify and mitigate impacts to significant historic properties.
Archaeological Resources Protection Act of 1979 (16 USC 470a-47011, as amended)	Protects archaeological resources on federal lands.
AR 420-40, Historic Preservation AR 200-4, Cultural Resource Management	Provides Army policies, procedures, and responsibilities for protecting and managing cultural resources.
Land Use	
EO 12372, Intergovernmental Review of Federal Programs	Directs federal agencies to consult with and solicit comments from state and local government officials whose jurisdictions would be affected by federal actions.
EO 11988, Floodplain Management	Requires each federal agency to take action to reduce the risk of flood damage, minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values served by floodplains.
Transportation	
Hazardous Materials Transportation Act of 1975 (HMTA) (49 USC 1761)	Authorizes the Secretary of Transportation to protect public health from the risks of transporting hazardous materials.

3.0 ALTERNATIVES CONSIDERED

The specific design of the Soft Recovery System has yet to be determined. The final design will be selected from two different potential designs or a combination of two or more designs. Potential designs include the RDECOM-ARDEC design and the ARL/Rheinmetall concept design. Present plans are to implement a combination of the RDECOM-ARDEC design and the ARL design.

While the specific design has yet to be determined, approximately the same amount of land and resources will be required to support the system. Depending upon the gun caliber, approximate length requirements vary from 100 to 180 meters. The development of five of these systems would require a total area measuring approximately 200 meters (656 feet) by 50 meters (150 feet). Air discharges, solid waste and water discharges are comparable for both designs.

Selection of a suitable area of the Arsenal for the construction and testing of the Soft Recovery System was conducted based on the technical, safety, and functional criteria for the Soft Recovery System, in addition to the environmental aspects of the proposed location. The 600 Area of the Arsenal was selected as the general location of the Proposed Action based on the restricted access to this area and its current use for similar activities. Potential sites considered under the Build Alternative were initially identified based on areas that provided suitable, relatively flat topography within required dimensions, located within the restricted access portion of the Arsenal, at least 150 meters (500 feet) from the property boundary, 100 meters (330 feet) from a public road, 170 meters (550 feet) from an inhabited building, and 60 meters (200 feet) intraline distance to a similar operation. Once the sites were identified, each site was screened for the presence of rock outcrops, wetlands and transition areas, vernal pools, threatened and endangered species, site access and available utilities. Based on the results of the screening, a preferred site was selected that best serves the project purpose and has the least potential for environmental impacts.

The following Build Alternatives to the Proposed Action have been considered and analyzed:

(1) No-Build Alternative
(2) Build Alternative - potential alternative site locations:
- 3620 Area – existing Rail Gun Facility
- B640;
- B647;
- B649.5;
- B670; and
- Area 3.

The feasibility of each of these alternatives is discussed below.

3.1 No-Build Alternative

The No-Build Alternative was considered. It was determined that this Alternative was unacceptable and would not be advanced because it would not allow the U.S. Army, RDECOM-ARDEC to fulfill its responsibility of developing and testing future weapons systems and was seen as directly conflicting with RDECOM-ARDEC's mission. The No-Build Alternative would

jeopardize the testing of future weapon systems. Such a system is needed to ensure that current and future precision munitions are afforded the highest levels of engineering excellence, quality, and consistency when they are evaluated. Without such a system the development and evaluation of new munitions would be hampered by a lack of accurate, timely available data.

As previously presented, a new Soft Recovery System is needed at the Arsenal to replace the existing, obsolete Rail Gun System located in the 3620 Area. The new system will be able to test the newer projectiles, such as 105 mm, 120 mm, and 155 mm howitzers and their munitions. The proposed Soft Recovery System will possess several capabilities that the existing Rail Gun System does not possess.

Eventually, as the existing projectiles that are being tested on the existing Rail Gun System are phased out of production, there would be no workload for the existing Rail Gun System and the U.S. Army, RDECOM-ARDEC would not have a facility capable of testing the newer projectiles.

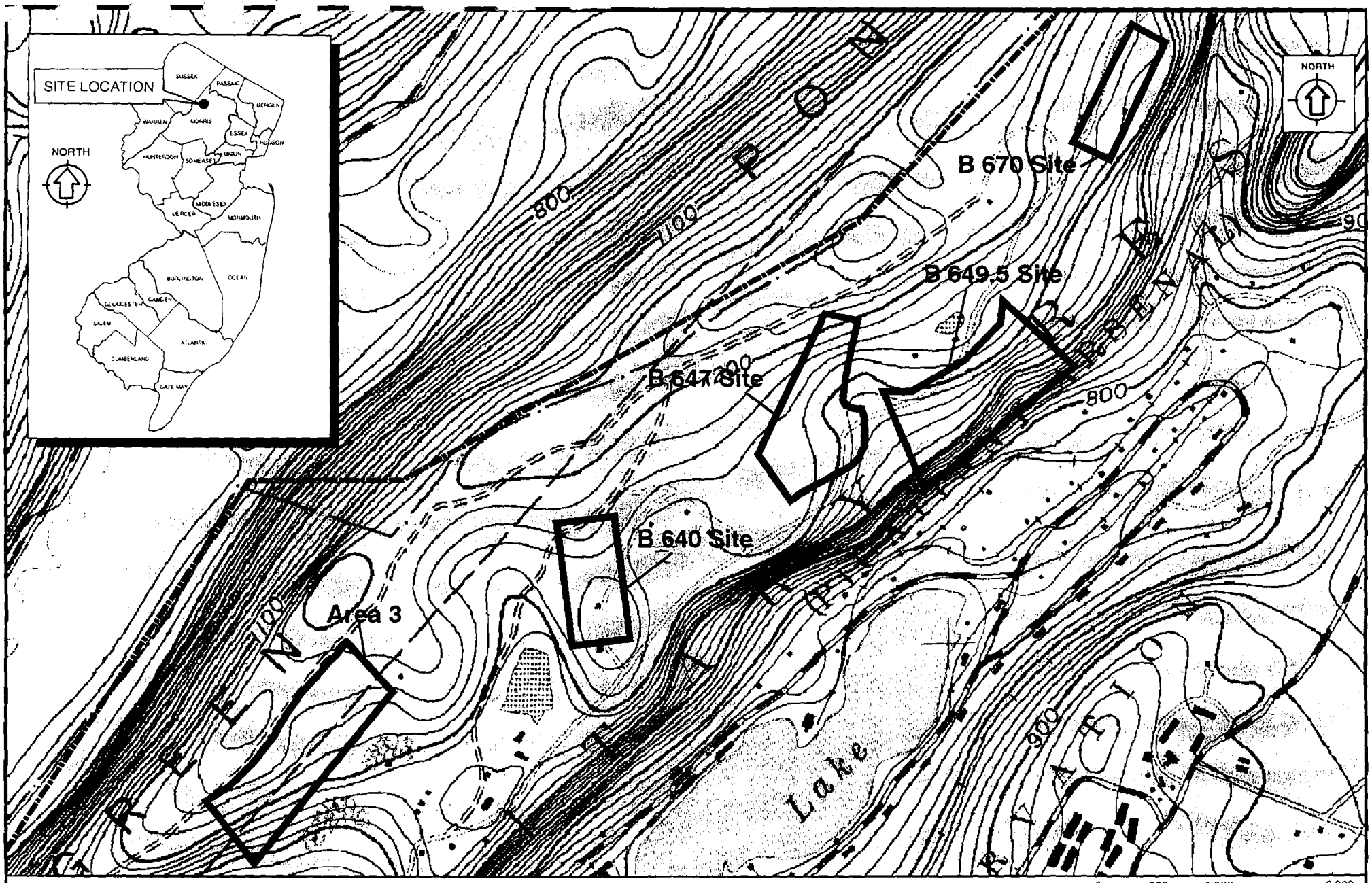
For these reasons, the No-Build Alternative was considered unacceptable and will not be given further consideration.

3.2 Build Alternative

The construction of a new Soft Recovery System under the Build Alternative will require the selection of a suitable area of the Arsenal as the location of the Proposed Action. Primarily, the suitable area must be located within a secured area of the Arsenal and must contain a sufficient buffer from other active areas. Due to safety considerations, the selected location of the Proposed Action must also be in an area of the Arsenal where similar types of operations are performed (i.e. Controlled and Restricted Firing Area, Safety Fan, Blast overpressure, and access to Energetics). For these reasons, the 600 Area of the Arsenal was selected as the general location of the Proposed Action. Therefore, all of the alternative site locations considered for the Soft Recovery System are located within the Robinson Gate Enclosure Area (600 Area) of the Arsenal. One exception was to evaluate the using the site of the existing rail gun (3620 Area) as an additional build alternative.

The selection of the initial alternative site locations within the 600 Area to be evaluated for the Proposed Action was based on several factors. These factors include the availability of a contiguous parcel containing relatively level ground, convenient access to the local road system, secluded landscape position, and safety clearance requirements of 100 meters (330 feet) from a public road, 170 meters (550 feet) from an inhabited building, and 60 meters (200 feet) intraline distance to a similar operation. Sites that had been partially disturbed by previous Arsenal-related research activities were also considered preferable to undisturbed sites.

Once the initial alternative site locations were identified, each alternative site location was further evaluated in the field based on technical, safety, environmental, and functional criteria. These criteria included existing topography, proximity to adjacent facilities, proximity to existing utilities, presence/absence of freshwater wetlands and state open waters, presence/absence of freshwater wetland transition areas, presence/absence of critical habitat for flora and fauna, and potential for cultural resources. The sites identified as areas that initially satisfied the site selection criteria are B640, B647, B649.5, B670 and Area 3. The characteristics of each of these sites are described below. The location of each site is shown on Figure 3-1.



Source: USGS 7.5 minute Topographic Quadrangle, Dover, NJ.

U.S. Army Corps of Engineers
New York District

Environmental Assessment for the
Ballistic Rail Gun System
Alternatives Considered

FIGURE 3-1

3.2.1 3620 Area

The 3620 Area of the Arsenal is the location of the existing, obsolete Rail Gun System and was considered as an alternative site for the upgrade of the Soft Recovery System Project. The 3620 Area is located off of Snake Hill Road, on the extreme eastern side of the Arsenal, in the vicinity of the reservoir. The 3620 Area is located in close proximity to Military Housing trailers, the Arsenal property boundary, and is not far (approximately 1 mile) from neighboring communities located off of Snake Hill Road. Utilities are readily available and access roads currently exist.

RDECOM-ARDEC determined that the 3620 Area was not feasible for the construction and operation of the new Soft Recovery System Project for safety reasons. The 3620 Area is not located in a restricted access area, such as the 600 Area of the Arsenal. In order to transport explosives to the 3620 Area, public roads must be used, exposing the public to unnecessary risk. This risk is removed by relocating the Soft Recovery System Facility to the 600 Area of the Arsenal. Similar use activities do not exist in the general location of the 3620 Area. In addition, the 3620 Area is located in close proximity to a public road (Snake Hill Road), the Arsenal property boundary, neighboring communities, and the Military Housing Trailers. Noise generated from frequent testing has the potential for creating significant noise impacts. For these reasons, the 3620 Area was eliminated from the alternatives analysis and will not be given further consideration.

3.2.2 B640 Site

The B640 site study area occupies approximately 4 hectares (10 acres). Portions of the site have been previously used by the Arsenal for munitions testing activities. Therefore, portions have been cleared of vegetation and contain existing structures. Existing structures include a large caliber testing device on the east side of the site, a bunker, and a temperature conditioning chamber on the west side. An access road to the B640 site exists off of the main access road (Bear Swamp Road). The remainder of the B640 site consists of a mesic, mixed oak - chestnut oak (*Quercus montana*) forest. The understory consists of a dense shrub layer dominated by mountain laurel (*Kalmia latifolia*). The interior of the site contains a few rock outcrops beneath the forest canopy. A forested wetland with a scrub-shrub component was observed east of the B640 site. The regulated wetland transition area associated with this wetland extends into a small portion of the B640 study area. In addition, the B640 site is located in an archaeologically sensitive area of the Arsenal and within the 600 Area Historic District. Utilities are readily available to the B640 site from Bear Swamp Road.

3.2.3 B647 Site

The B647 site study area occupies approximately 6.1 hectares (15.1 acres), a large portion of which has been previously disturbed for research-related activities associated with munitions testing. Therefore, a large portion of the B647 site has been previously cleared. An access road to the site currently exists off of Bear Swamp Road. The north side of the site contains rock cliffs which provide a natural barrier. Natural areas located within the limits of the B647 site include freshwater wetlands and associated transition areas, vernal pool habitat, and hardwood forests. In addition, undisturbed portions of this site are in an archaeologically sensitive area and the entire site is within the 600 Area Historic District of the Arsenal. Utilities are readily available to the B647 site from Bear Swamp Road.

It was determined that natural resource features, including freshwater wetlands and associated transition areas, and vernal pool habitat would be encroached upon and most likely impacted, regardless of the Soft Recovery System alignment. For these environmental reasons, it was determined that the B647 site was not feasible for construction and operation of the Soft Recovery System Project. Therefore, the B647 site was eliminated from the alternatives analysis and will not be given further consideration.

3.2.4 B649.5 Site

The B649.5 site study area occupies approximately 7.9 hectares (19.5 acres). This site consists of a long, southeast facing slope on the south side of Bear Swamp Road. The B649.5 Area consists of a mixed hardwood forest; in portions of the site the majority of the trees are dead or severely stressed. The interior portion of the site contains dense stands of mountain laurel, fewer standing dead trees, and significant rock outcrops. The B649.5 site is partially located within an archaeologically sensitive area of the Arsenal and within the 600 Area Historic District. Utilities are readily available to the site from Bear Swamp Road.

It was determined by RDECOM-ARDEC that the B649.5 site was not feasible for construction and operation of the Soft Recovery System Project. Due to the sloping topography of the B649.5 site, construction of the rail guns would require terracing of the hillside to accommodate the rail guns. Extensive earthmoving and rock excavation would be required. Additional work would be required to extend water and electric utilities to this site and construct an access road off of Bear Swamp Road. These requirements would add significant costs to the project. The landscape position of the B649.5 site and east facing slope would not effectively contain noise within the Arsenal generated from the Soft Recovery System. For these reasons, the B649.5 site was eliminated from the alternatives analysis and will not be given further consideration.

3.2.5 B670 Area

The B670 site study area consists of approximately 2.8 hectares (6.9 acres) of mostly disturbed land surrounded by hardwood forest. The site is bordered on the northern side by a steep, rising slope and on the south side by a secondary growth hardwood forest. Two vernal pools were identified in the northeast portion of the study area and a drainage ditch was identified along the northern site boundary. The interior of the site has been cleared and is currently covered with a mix of gravel and cool season grasses. The undisturbed portions of the B670 site are located within an archaeologically sensitive area and within the 600 Area Historic District of the Arsenal. Utilities are readily available to the site from Bear Swamp Road.

The Arsenal is currently using the B670 site as an existing munitions test facility. It was determined by RDECOM-ARDEC that the current munitions testing at the B670 site could not be relocated to another test site in the 600 Area and still meet existing security and safety requirements. For these safety reasons, it was determined that the B670 site was not feasible for construction and operation of the Soft Recovery System Project. Therefore, the B670 site was eliminated from the alternatives analysis and will not be given further consideration.

3.2.6 Area 3

Area 3 is a parcel approximately 8.1 hectares (20.0 acres) in size, consisting entirely of hardwood forest. The site is more remote than the other alternative site locations within the 600 Area of

Arsenal. Area 3 is gently sloping on the northern side, trending towards steeper slopes on the southern side. This site is devoid of wetlands, including vernal pools, and associated transition areas. Portions of Area 3 are within an archaeologically sensitive area of the Arsenal and within the 600 Area Historic District. Access to the site is limited to segments of a one-lane dirt road and a one-lane paved road. Utilities are not presently available. Electric service would need to be extended a considerable distance to the site along a new alignment.

It was determined by RDECOM-ARDEC that the Area 3 would not be advanced as the preferred site for several reasons. The sloping topography of the Area 3 site would require significant earthwork to terrace the hillside for construction of the Soft Recovery System Project and would result in a larger footprint of disturbance within an undeveloped hardwood forest. Additional work would be required to extend water and electric utilities to this site. The existing one-lane dirt road and one-lane paved road would need to be widened and paved to provide access to Area 3. Due to the landscape position of the Area 3 site, an east facing slope, noise generated from the Soft Recovery Systems would most likely travel greater distances and could not be effectively contained within the Arsenal. Area 3 was determined to be less suitable due to the additional construction costs and potential for greater environmental impact associated with loss of upland forest. For these reasons, Area 3 was eliminated from the alternatives analysis and will not be given further consideration.

3.2.7 Preferred Alternative (B640 Site)

Following the initial site assessment and field reconnaissance, each site was evaluated and a preferred site was selected on the basis of preferable site characteristics for the construction of the Soft Recovery System. The B640 site was selected as the Preferred Alternative.

The B640 site is ideal for the construction of the Soft Recovery System due to its size, which is sufficient in length and width to accommodate all necessary features of the Proposed Action with minimal grading and earthwork in comparison to other sites. The reduced grading requirements would result in a reduction in the disturbance to vegetated habitats. The B640 site also has direct access to required utilities and is readily accessible from a main road (Bear Swamp Road) via an existing paved entrance road. Although a forested wetland with a scrub-shrub component exists to the east of the B640 site and the regulated wetland transition area does fall within the B640 site boundary, disturbance to the wetland transition area can be avoided.

The topography of the B640 site is also preferable for the Proposed Action. The landscape position of the B640 site in relation to the adjoining hills and valleys is ideal for providing a natural sound barrier and/or termination point during the ballistic testing, providing an additional noise and safety benefit. For these reasons, the B640 site was determined to be the Preferred Alternative for the construction and operation of the Soft Recovery System.

4.0 EXISTING ENVIRONMENT

4.1 Physiography and Soils

The B640 site study area is located in the New Jersey Highlands of northern New Jersey, a portion of the Reading Prong of the New England Physiographic Province, in a region known as the Green Pond Syncline. The Highlands are underlain by granite, gneiss and small amounts of marble from the Precambrian age. These rocks are the oldest in New Jersey and formed between 1.3 billion and 750 million years ago by melting and re-crystallization of sedimentary rocks that were deeply buried, subjected to high pressure and temperature, and intensely deformed. The Highlands are characterized by northeast-southwest trending ridges separated by long, broad valleys and consist of broad mountain ranges separated by deep valleys between 400 to 600 feet below the ridge crests. The Highlands are situated between the Picatinny Valley's Paleozoic strata in the west and the Piedmont Lowlands Triassic and Jurassic strata to the east.

The elevation of the B640 site ranges from approximately 1120 feet to over 1150 feet above mean sea level (msl). Elevations are generally higher within the central portion of the B640 site and generally decrease to the west and east of the study area boundary.

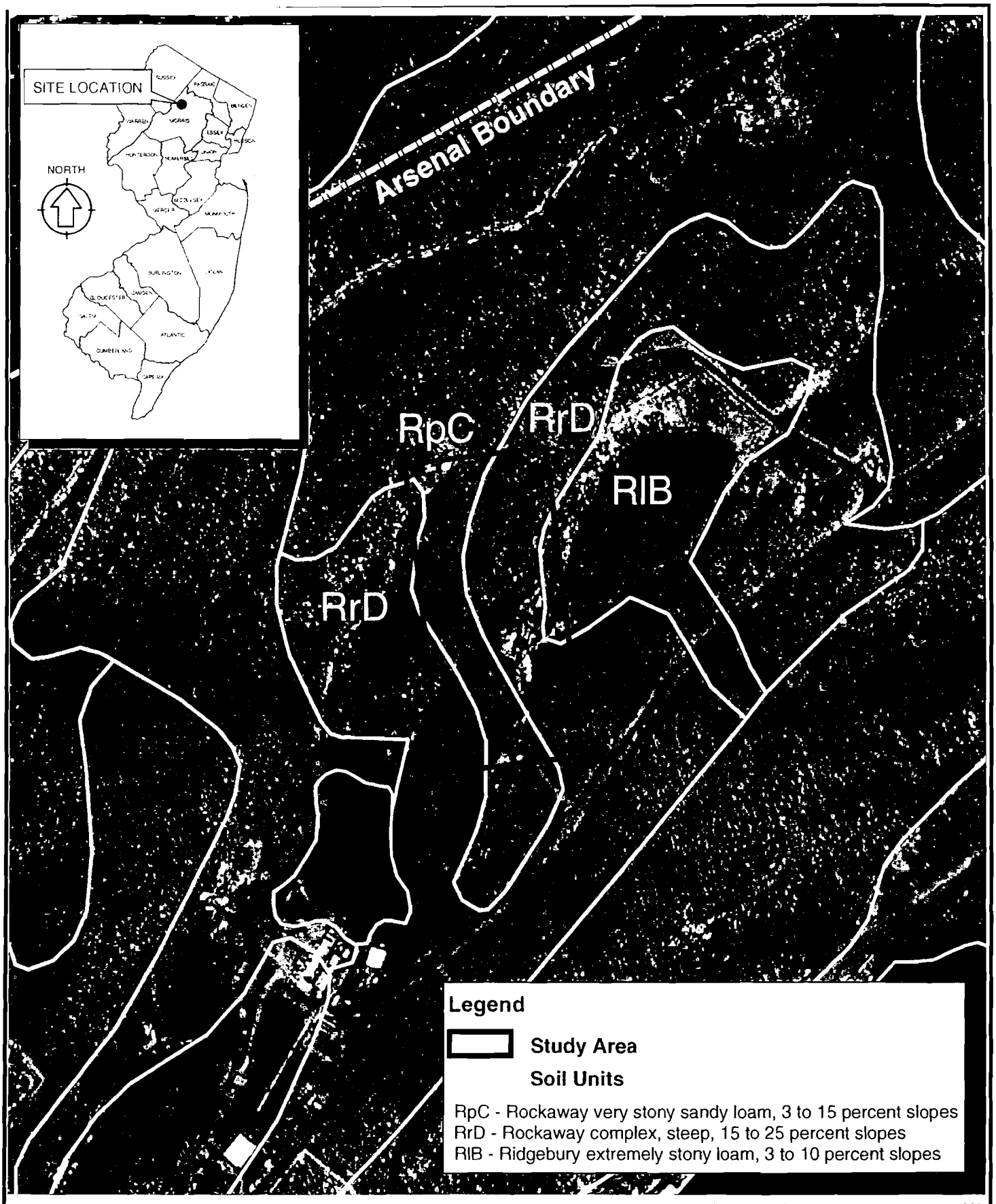
The *Soil Survey of Morris County, New Jersey* (USDA-MCSCD, 1976) indicates that the soils within the B640 site consist of two soil series and three soil mapping units (or soil phases) (Figure 4-1). The Rockaway soil series occurs over the majority of the site and the Ridgebury soil series is present in a small part of the eastern side of the site. The soil map units shown within the study area are described below. The soil descriptions are based on the text of the *Soil Survey of Morris County, New Jersey*. Soils characteristics are summarized in Table 4-1.

Table 4-1 - Soil Characteristics

Map Unit	Unit Name	Drainage Class	Depth to Bedrock	Erosion Hazard	Prime Farmland	Hydric Soil
RIB	Ridgebury extremely stony loam, 3 to 10 percent slopes	Poorly drained	>10 feet	Moderate to slight	No	Yes
RpC	Rockaway very stony sandy loam, 3-15 percent slopes	Well drained to moderately well drained	>10 feet	Moderate	No	No
RrD	Rockaway extremely stony sandy loam, 15-35 percent slopes	Well drained to moderately well drained	>10 feet	Severe	No	No

Source: *Soil Survey of Morris County, New Jersey*. USDA-MCSCD, 1976.

Rockaway extremely stony sandy loam, 15 to 25 percent slopes (RrD): This mapping unit consist of deep, steep, well drained to moderately well drained soils located in uplands. These soils formed in sandy loam glacial till that contains various kinds of rock, but is mainly granitic material. Stones and boulders cover 10 percent of the soil surface and are 5 to 30 feet apart. In some areas, bedrock outcrops are present. The subsoil is nearly 30 percent coarse fragments. In addition, these soils have a moderately developed fragipan.



Source: NJDEP Digital Orthophoto, Dover-NE, 1995/1997. NRCS Soil Survey for Morris County.

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SOILS MAP

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FIGURE
4-1

The surface layer is dark grayish-brown cobbly sandy loam about 8 inches thick, and the subsoil is about 28 inches thick. The upper 12 inches of the subsoil is strong brown gravelly sandy loam, while the lower 16 inches is a fragipan of mottled, strong brown, firm and brittle gravelly sandy loam. The depth to bedrock is greater than 10 feet.

Runoff is rapid and the erosion hazard is severe. The available water capacity is low. Permeability is moderate above the fragipan and slow in the fragipan. This soil is suitable for pasture, woodland, or wildlife; has moderate limitations that require conservation practices and has limitations of root growth in subsoil due to shallow, droughty, or stony soil. This mapping unit is not identified as prime farmland.

Rockaway very stony sandy loam, 3 to 15 percent slopes (RpC): This mapping unit consists of deep, gently sloping, well drained to moderately well drained soils located on uplands. These soils formed in sandy loam glacial till that contains various kinds of rock, but is mainly granitic material. Stones and a few boulders cover approximately 3 percent of the soil surface. Stones on the surface are 5 to 30 feet apart. The subsoil and substratum are nearly 30 percent coarse fragments. In addition, these soils have a moderately developed fragipan.

The surface layer is dark grayish-brown, cobbly sandy loam about 8 inches thick, and the subsoil is about 28 inches thick. The upper 12 inches of the subsoil is strong brown gravelly sandy loam, while the lower 16 inches is a fragipan of mottled, strong brown, firm and brittle gravelly sandy loam. The depth to bedrock is greater than 10 feet.

Runoff is moderate and the erosion hazard is moderate. The available water capacity is low. Permeability is moderate above the fragipan and slow in the fragipan. This soil is suitable for few uses; needs moderately severe conservation practices and/or drainage and has a hazard of erosion due to light soil texture and/or loose soil structure. This mapping unit is not identified as prime farmland.

Ridgebury extremely stony loam, 3 to 10 percent slope (RlB): This mapping unit consists of deep nearly level to gently sloping, poorly drained very stony or extremely stony soils. These soils formed in glacial till derived largely from granitic gneiss and a small amount of micaceous gneiss and many kinds of quartzite, sandstone, and shale. In addition, these soils have a well-developed fragipan.

The surface layer is about 9 inches thick. The upper 4 inches of the surface layer is black gravelly loam, and the lower 5 inches is mottled, light yellowish-brown sandy loam. The upper part of the subsoil, to a depth of about 14 inches, is mottled, light brownish-gray, gravelly light sandy loam. The lower part is a very firm and dense fragipan that is light olive-brown gravelly light sandy loam to a depth of about 26 inches.

This gently sloping soil is found at the base of slopes, where it receives runoff and seepage from higher areas. The erosion hazard is moderate. In wooded areas the erosion hazard is slight.

Permeability is moderate above the fragipan and slow in the fragipan. This soil is not suited for cultivation. It is better suited to woodland and wildlife than to other uses. This soil is listed as a hydric soil on the *Hydric Soils - Morris County, New Jersey* (USDA-SCS, 1990).

4.2 Vegetative Communities

The Arsenal contains terrestrial and aquatic macrophytic species consisting of 626 species of flowering plants and 90 species of non-flowering plants (USACE, Integrated Natural Resource Management Plan 2001). The most common types of terrestrial plant life include: forest/woodland upland type characterized by a close stand of trees in a natural area; transitional forest/woodland consisting of primarily native trees located in a forest or woodland stand; urban/industrial vegetation consisting of turfgrass, associated forbs and ornamental herbaceous and woody plants; and transitional urban/industrial vegetation, characterized by indigenous and exotic plants with a predominance of ornamental vegetation. The woodlands have been further categorized into two major groups: palustrine forests and upland forests. Surface waters at the Arsenal include streams, ponds, lakes, reservoirs, and wetlands.

Endangered plants and species of concern are known to exist or believed to occur on the Arsenal. Several species are believed to exist within the Arsenal, but lack vouchered data to concretely determine their presence.

A description of the vegetative communities identified within the B640 site is provided below. Table 4-2 lists vegetation observed within the B640 site.

4.2.1 Uplands

The entire B640 site study area (approximately 4 hectares/10 acres), is upland. A small area within the southeast corner of the B640 site has been previously cleared of vegetation and contains existing structures. Vegetation within this portion of the site is limited to cool season grasses interspersed amongst patches of gravel. The remainder of the B640 site consists of a mixed oak - chestnut oak forest, which is the predominant forest type within the 600 Area of the Arsenal. Canopy species include white oak (*Quercus alba),* red oak (*Quercus rubra),* black oak (*Quercus velutina),* and chestnut oak. The understory consists of a dense shrub layer dominated mainly by mountain laurel and lowbush blueberry (*Vaccinium angustifolium).* Poison ivy (*Toxicodendron radicans)* and multiflora rose (*Rosa multiflora*) grow sporadically.

A forested wetland with a scrub-shrub component was observed east of the B640 site. The regulated wetland transition area associated with this wetland occurs within the B640 site boundary.

4.2.2 Wetlands

There are approximately 1,250 acres of wetlands located within the boundaries of the Arsenal. These wetlands are primarily composed of muck and peat formed in poorly drained glacial soils. Wetlands at the Arsenal include freshwater marshes and swamps, which are linked to other surface aquatic systems at the Arsenal, including two lakes, more than 30,000 linear feet of streams, 18 ponds, and a network of drainage canals. Figure 4-2 depicts wetlands that have been mapped by the New Jersey Department of Environmental Protection (NJDEP) in the vicinity of the B640 site.

A forested wetland with a scrub-shrub component was observed east of the B640 site boundary. This wetland consists mainly of young red maple (*Acer rubrum*) and pin oak (*Quercus palustris*)

Table 4-2 - Vegetation Observed within the B640 Site Study Area

Trees, Shrubs and Woody Vines

Scientific Name	Common Name	Indicator Status
Betula populifolia	gray birch	FAC+
Carya ovata	shagbark hickory	FACU-
Ilex verticillata	winterberry	FACW+
Kalmia latifolia	mountain laurel	FACU
Quercus alba	white oak	FACU-
Quercus ilicifolia	scrub oak	UPL
Quercus montana	chestnut oak	UPL
Quercus rubra	red oak	FACU-
Quercus velutina	black oak	NL
Rosa multiflora	multiflora rose	FACU
Toxicodendron radicans	poison ivy	FAC
Vaccinium angustifolium	lowbush blueberry	FACU-

Forbs

Scientific Name	Common Name	Indicator Status
Andropogen sp.	bluestem	**
Polystichum acrostichoides	christmas fern	FACU-
Solidago	goldenrod	**
Verbascum thapsus	common mullein	NL

Key to indicator categories:

OBL: Obligate Wetland, occur almost always (estimated probability >99%) under natural conditions in wetlands.

FACW: Facultative Wetland, usually occurs in wetlands (estimated probability 67%-99%), but occasionally found in non-wetlands.

FAC: Facultative, equally likely to occur in wetlands or non-wetlands (estimated probability 34%-66%).

FACU Facultative Upland, usually occurs in uplands (estimated probability 67%-99%), but occasionally found in wetlands (estimated probability 1%-33%)

NA: Not Applicable, only vascular plants are assigned indicator statuses.

NL: Not found on national listings of plants occurring in wetlands.

A positive (+) sign following an indicator indicates a frequency toward the higher end of a category.
A negative (-) sign following an indicator indicates a frequency toward the lower end of a category.
An asterisk following an indicator denotes a tentative assignment of the indicator.

Source: *National List of Plants that Occur in Wetlands: New Jersey*. U.S. Fish and Wildlife Service, 1988.

1996 National List of Vascular Plant Species that Occur in Wetlands. (All Regions). U.S. Fish and Wildlife Service, March 1997.

1995 Supplement to the List of Plant Species that Occur in Wetlands: Northeast (Region 1). U.S. Fish and Wildlife Service, August 1995.

in the overstory, mountain laurel and arrowwood (*Viburnum recognitum*) in the mid-story, and sensitive fern (*Onoclea sensibilis*) in the understory. The limits of this wetland were delineated by qualified wetland scientists pursuant to the *1989 Federal Manual for Identifying and Delineating Jurisdictional Wetlands* and do not encroach onto the site. Wetland limits are shown on Figure 4-2. Based on the assumption that this wetland is of exceptional resource value, the highest possible designation, the NJDEP regulates activities within a 150-foot wide wetland transition area adjacent to the delineated wetland. Portions of the regulated transition area fall within the limits of the B640 site study area (Figure 4-2).

4.3 Floodplains and Surface Waters

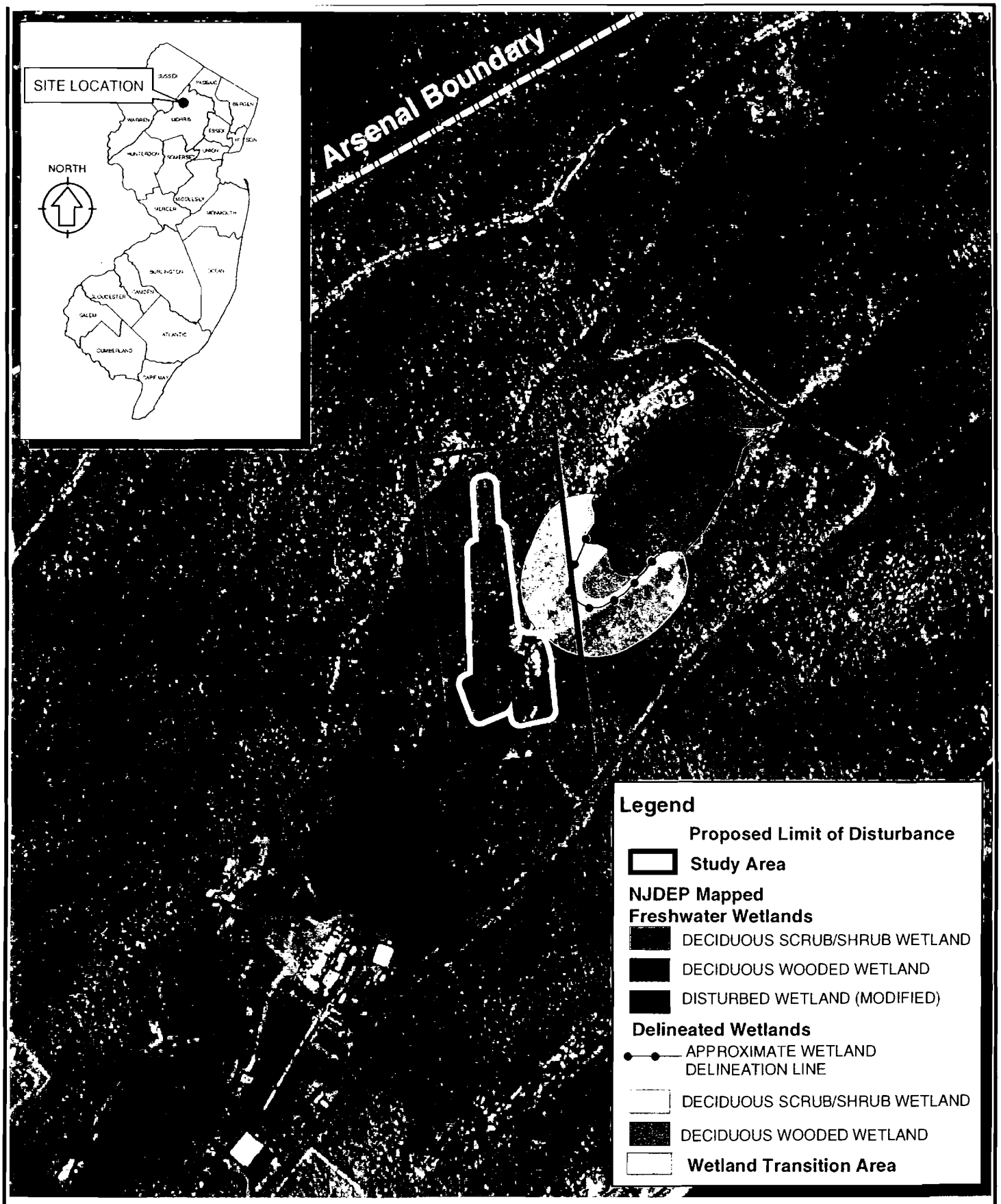
Federal Emergency Management Agency (FEMA) mapping has not been prepared for a large portion of Picatinny Arsenal. Therefore, it is difficult to determine exact 100-year floodplain areas. However, draft 100-year floodplain maps have been developed for the installation. The maps being developed confirm that the B640 site is not within the 100-year floodplain boundary. According to FEMA mapping covering smaller areas, the Arsenal is located in an area of undetermined, but possible flood hazards. There is one delineated floodplain located within the Arsenal, namely the Green Pond Brook floodplain, which is located at the southern end of the Arsenal and has been highly disturbed by Arsenal activities (Figure 4-3). The B640 site is not located within the floodplain.

The surface water features at the Arsenal consists of numerous streams, ponds, lakes, reservoirs, and wetlands. Green Pond Valley is primarily drained by Green Pond Brook and its major tributaries: Bear Swamp Brook and Burnt Meadow Brook. Green Pond, located north of the Arsenal, feeds into Green Pond Brook. From Green Pond Brook, water flows through the valley and the center of the Arsenal, exiting at the Arsenal's southern boundary and discharging to the Rockaway River approximately 1.7 miles south of the Arsenal. The Arsenal also contains two large lakes, Lake Denmark and Picatinny Lake.

The B640 site is located approximately 1500 feet northwest of Picatinny Lake and within the immediate watershed of the lake. There are no surface water features on the site and therefore, no direct connection to the lake. Picatinny Lake is located near the center of the Arsenal at an elevation of about 720 feet above msl. It is fed by Green Pond Brook and by water released from Lake Denmark. Picatinny Lake has been classified by the NJDEP as non-trout waters (*State Water Quality Standards N.J.A.C 7:9B).*

4.4 Wildlife

Faunal species present within the Picatinny Arsenal include a wide variety of terrestrial mammals, birds, reptiles, amphibians, fish, and insects, including federal and state listed threatened and endangered species (see Section 4.5). Two hundred eighty vertebrate species are known to occur and are representative of fauna of the highland region of New Jersey. The known species, depending on their specific niche requirements, use forested lands, talus and rocky slopes, old fields, lentic or lotic aquatic sites, wetlands and improved/semi-improved grounds as habitats. The Arsenal's Environmental Affairs Office maintains records on vertebrate occurrence and abundance. Lists of wildlife known to occur at the Arsenal have been compiled as part of the RDECOM-ARDEC Integrated Natural Resources Management Plan, 2001. The specific lists include Picatinny Dragonfly & Damselfly List (31 species), Picatinny Butterfly & Moth List (193



Source: NJDEP Digital Orthophoto, Dover-NE, 1995/1997. NJDEP Wetlands Data.

Scale in Feet 1" = 400'

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FRESHWATER WETLANDS

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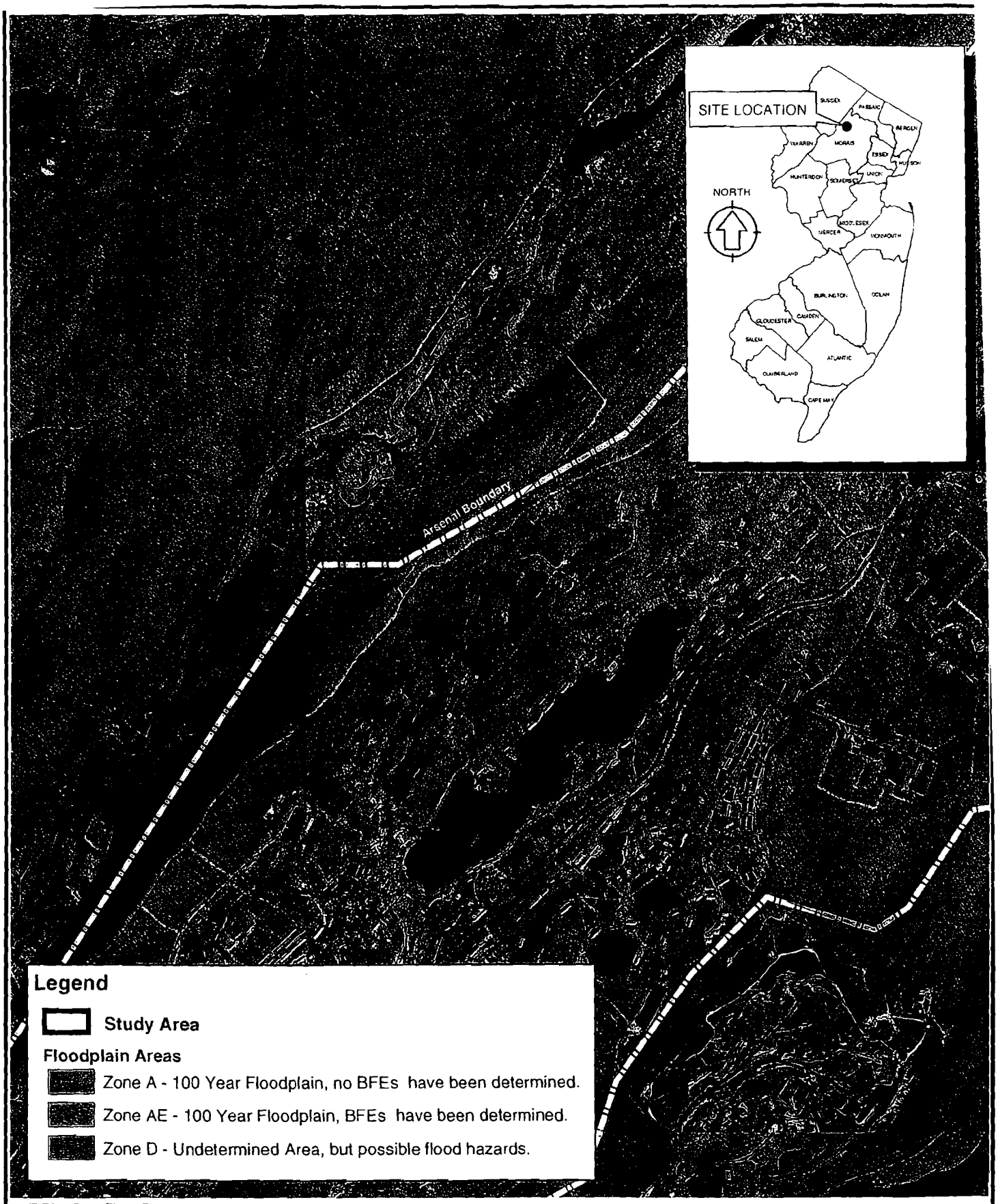
FIGURE 4-2



(BFE = Base Flood Elevation)

0 1000 2000 4000

Scale in Feet 1" = 2000'

Source: NJDEP Digital Orthophoto, Dover-NE, 1995/1997. FEMA Floodplain Data.

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FLOODPLAINS

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FIGURE 4-3

species), Picatinny Herptile List (40 species), Picatinny Bird List (208 species), and Picatinny Mammal List (41 species). These lists are included in Appendix A.

The majority of the B640 Site study area consists of a mixed oak - chestnut oak forest with a dense understory of mountain laurel. This is the predominant forest type within the 600 Area of the Arsenal. A small section of the central portion of the site surrounding the existing B640 facilities includes a cool season grass area and paved surfaces. The north-central portion of the site adjoins an offsite wetland composed of scrub shrub and young forest habitat types.

Typical faunal species utilizing on site habitat types would include mammals such as white-tailed deer (*Odocoileus virginianus*), eastern cottontail rabbit (*Sylvilagus floridanus*), opossum (*Didelphis marsupialis*), coyote (*Canis latrans*), gray and red fox (*Urocyon cinereoargenteus* and *Vulpes fulva*), striped skunk (*Mephitis mephitis*), eastern gray squirrel (*Sciurus carolinensis*), and multiple rodent species. Reptile species utilizing these habitats may include the eastern garter snake (*Thamnophis sirtalis*), eastern ribbon snake (*Thamnophis sauritus*), northern brown snake (*Storeria dekayi*), black rat snake (*Elapha obsoleta obsoleta*) and eastern milk snake (*Lampropeltis doliata*).

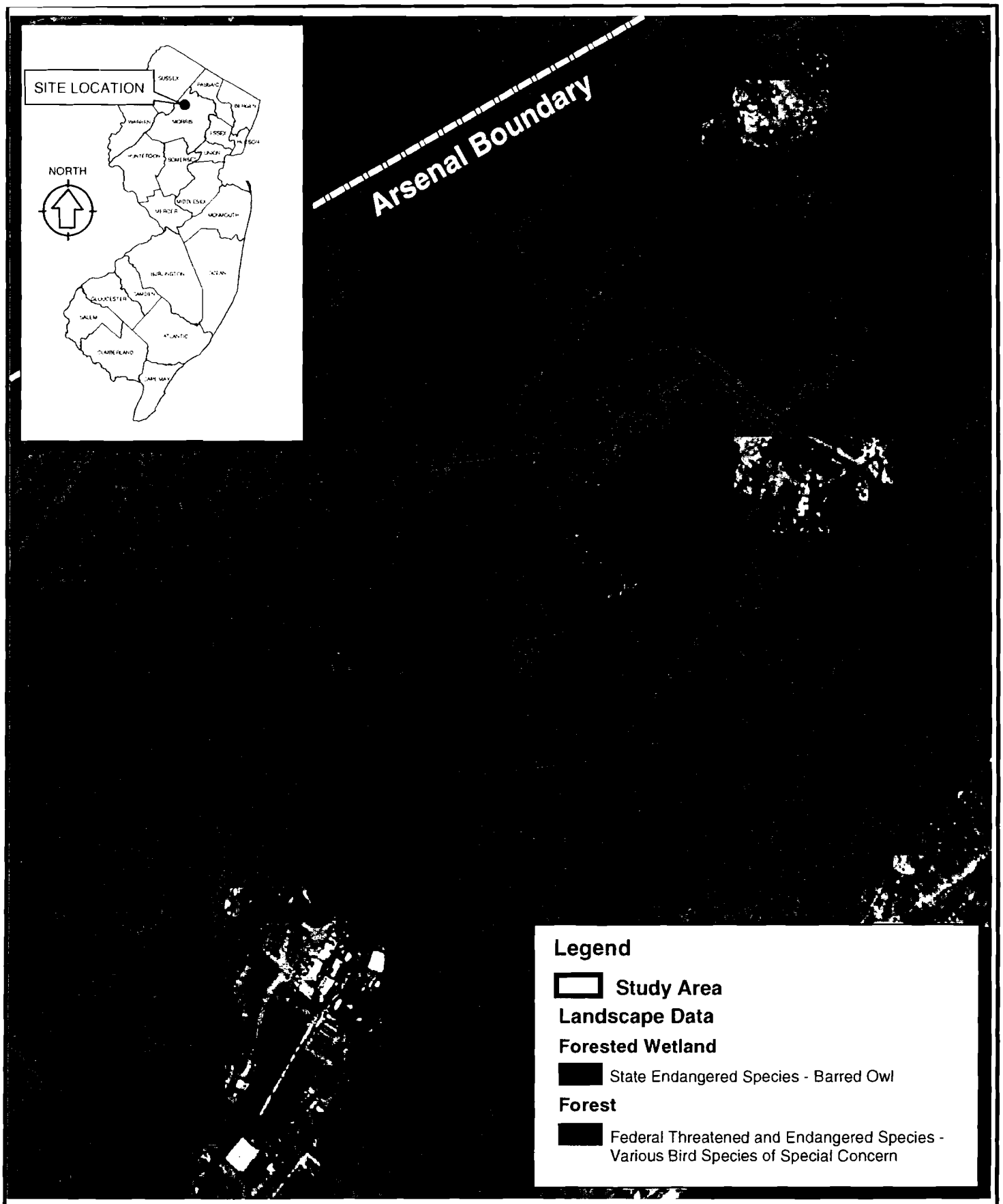
Woodland dwelling bird species belonging to species groups such as warblers, woodpeckers, flycatchers and thrushes would be expected to use the forested portions of the site. Typical species that may be encountered include the blue-winged warbler (*Vermivora pinus*), yellow warbler (*Dendroica petechia*), American redstart (*Setophaga ruticilla*), red-eyed vireo (*Vireo olivaceus*), downy woodpecker (*Picoides pubescens*), great crested flycatcher (*Myiarchus crinitus*), and American crow (*Corvus brachyrhynchos*). The cleared areas surrounding the testing facilities would be utilized by common species such as song sparrow (*Melospiza melodia*), mourning dove (*Zenaida macroura*) and European starling (*Sturnus vulgaris*), and could be used as a foraging area by raptors (owls and hawks).

4.5 Threatened and Endangered Species

Federal endangered and threatened plant and animal species are defined and protected by the Endangered Species Act of 1973 as regulated by the U.S. Fish and Wildlife Service (USFWS). State threatened and endangered wildlife species are defined and protected by the Endangered and Nongame Species Conservation Act of 1973 as regulated by the NJDEP. Several federal and state listed species are known to occur within the boundaries of Picatinny Arsenal.

Information regarding the occurrence of plant and animal species of special status (federal and state threatened or endangered species) in the vicinity of the B640 Area was obtained from NJDEP Natural Heritage Program (NHP) and from the USFWS (Appendix B). The NJDEP Landscape Project data was also consulted in order to ascertain whether any listed species or habitats critical to these species had been documented on the preferred site. Figure 4-4 presents the NJDEP Landscape Project mapping for the B640 Site study area.

According to the information contained in the Natural Heritage Database (letter dated November 24, 2003) and the USFWS (letter dated September 16, 2003), thirteen special status wildlife species have been recorded within the general vicinity of the B640 site. These species and their current status are listed in Table 4-3. The habitat present within the B640 site may be suitable for several of the listed species that are known to utilize upland forest habitat. Based on available habitat, field investigations, and information provided by the USFWS, NHP, and the Natural



Source: NJDEP Digital Orthophoto, Dover-NE, 1995/1997. NJDEP Landscape Data.

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LANDSCAPE PROJECT DATA

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FIGURE
4-4

TABLE 4-3 - FEDERAL AND STATE LISTED WILDLIFE SPECIES

Scientific Name	Common Name	Status
Accipiter cooperii	Cooper's hawk	ST
Accipiter gentilis	northern goshawk	SE
Ardea herodias	great blue heron	SS
Buteo lineatus	red-shouldered hawk	SE/ST
Clemmys insculpta	wood turtle	ST
Crotalus horridus horridus	timber rattlesnake	SE
Eurycea longicauda longicauda	longtail salamander	ST
Haliaeetus leucocephalus	bald eagle	FT, SE
Lynx rufus	bobcat	SE
Melanerpes erythrocephalus	red-headed woodpecker	ST
Myotis sodalist	Indiana bat	FE, SE
Neotoma magister	Allegheny woodrat	SE
Strix varia	barred owl	ST

KEYS:

FE = Federal Endangered
FT = Federal Threatened
SE = State Endangered
ST = State Threatened
SS = State Stable Species
Source: NJDEP NHP Nature Heritage Database.

Resource Manager at the Arsenal, the federal and state listed (endangered) Indiana bat (*Myotis sodalis*), and the State listed (threatened) Cooper's hawk (*Accipiter cooperii)* and State listed (endangered) timber rattlesnake (*Crotalus horridus horridus*) have the potential to occur within the immediate vicinity of the B640 site. The remaining species are not likely to occur on the site due to the absence of suitable habitat for these species.

The USFWS reported that three Indiana bat hibernaculum are known to occur within 5 miles of the site and that Indiana bats may forage and roost at the Arsenal before and after hibernation. The USFWS also reported that Indiana bats have been documented roosting on the Arsenal during breeding season. The period of activity for Indiana bats is between April 1 and November 15. Other than the occasional transient bald eagle (*Haliaeetus leucocephalus*), no other federal listed species are anticipated to occur within the study area.

The state listed Cooper's hawk nests in mature hardwood forests within the region. At the Arsenal, this species has been reported to breed near tree stands containing conifer trees at the northern and southern extent of the Arsenal and has not been recorded within the vicinity of the site (Van De Venter, J., person. comm.).

The timber rattlesnake has been documented as occurring within the Arsenal boundary. Although not previously documented on the B640 site, suitable foraging habitat for this species does exist, which may be utilized between April and October while this species is active.

The NJDEP Landscape Project mapping indicates the presence of potential habitat for the state listed (threatened) barred owl (*Strix varia*) within the wetland area to the northeast of the site. The small size and structure of the plant community (young trees and shrubs) is not typical of barred owl habitat and is not expected to support this species.

The NJDEP NHP also noted that the B640 site to be within a Natural Heritage Priority Site referred to as the Green Pond Mountain Macrosite. This macrosite is described as a large landscape patch of forests, lakes, and streams, much of which is located within the Picatinny Arsenal. This Priority Site has a biodiversity rank of B4, meaning the site is of moderate state significance.

4.6 Air Quality

Air quality is evaluated by comparing area air pollutant amounts with the National Ambient Air Quality Standards (NAAQS) for outdoors established by the U.S. Environmental Protection Agency (USEPA). NAAQS are defined as the maximum acceptable ground-level concentrations that may be equaled but not exceeded within a specified area. The State of New Jersey has also established ambient air quality standards for the same pollutants covered by the NAAQS, with some variation in the secondary standards for ozone, sulfur dioxide, and total suspended particulates. The standards include maximum concentrations for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, particulate matter with a diameter of 10 μm or less and lead. Exceeding a concentration is a violation and constitutes a non-attainment of the standard. Standards are not to be exceeded more than once per year, except for ozone and particulate matter, which are not to be exceeded more than an average of one day per year. The Federal and New Jersey standards for the pollutants potentially emitted during operations at the Arsenal are presented in Table 4-4. Currently the State of New Jersey is in non-attainment of the standard for ozone.

No air quality monitoring stations operate in the vicinity of Rockaway Township, including at the Arsenal, but all pollutants, with the exception of ozone, are presumed to be within the applicable standards because the air quality of Rockaway Township is classified as "better than national standards" (Environmental Baseline Study, 1992). To address ozone non-attainment, the Arsenal is required to control nitrogen oxide and volatile organic compound emissions as part of a 'General Conformity Rule'.

4.7 Noise

Natural noise levels at the Arsenal are generally quite low. Noise varies in different areas of the Arsenal depending on human activities. In some areas the noise level may be higher due to vehicular traffic, construction, machine shop operations, etc. Traffic noise is the most common and steady source of noise within the Arsenal. Other sources of noise which aren't as constant but exceed normal sound levels are explosive detonations and test firings which can produce sound levels in excess of 170 decibels (dB) in the area of the firing.

TABLE 4-4 - NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	National Standards		New Jersey Standards	
		Primary	Secondary	Primary	Secondary
Carbon Monoxide	* 8-hour	10 mg/m^3 (9 ppm)	Same	10 mg/m^3 (9 ppm)	
	* 1-hour	40 mg/m^3 (35 ppm)	Same	40 mg/m^3 (35 ppm)	
Nitrogen Dioxide	Annual	100 g/m^3 (0.05 ppm)	Same	100 g/m^3 (0.05 ppm)	
Ozone	1 Hour	235 g/m^3 (0.12 ppm)	Same	235 g/m^3 (0.12 ppm)	
Sulfur Dioxide	Annual	80 g/m^3 (0.03 ppm)		80 g/m^3 (0.03 ppm)	
	* 24-hour	365 g/m^3 (0.14 ppm)		365 g/m^3 (0.14 ppm)	
	* 3-hour		1300 g/m^3 (0.5 ppm)		1300 g/m^3 (0.5 ppm)
Particulate Matter < 10 microns	Annual	50 g/m^3	Same	50 g/m^3	
	* 24-hour	150 g/m^3	Same	150 g/m^3	

* Not to be exceeded more than once per year for secondary and primary standard

Source: Code of Federal Regulations, 40 CFR 50.4-50.12; N.J.A.C. 7:27-13.

4.8 Groundwater

Ground water movement at the Arsenal is in response to hydraulic gradients. In Morris County, the direction and magnitude of the natural gradients are controlled largely by the topography, and the resulting water-table profile approximates the local topographic profile except that it has less relief. Water that enters the ground water body in the interfluve areas (upland recharge areas) where the water table is at relatively higher elevations, moves slowly toward the intervening stream channels lying at lower elevations. Ground water is discharged directly to the streams wherever they intersect the water table and supports stream flow during periods of no precipitation.

The ground water located within the confines of the Arsenal is found in sediments deposited during the Quaternary Period within the last one million years and has been designated a sole source aquifer. These sediments consist of undifferentiated sand, gravel and boulders in the terminal moraine which was deposited during the Wisconsin glaciation. The Rockaway Basin Aquifer is located to the south of the Arsenal and is a designated a sole source aquifer. There are 127 existing wells within this aquifer which yield an average of 502 gallons per minute (gpm).

The ground water flow regime is influenced by Green Pond Brook which is located approximately 4000 feet from the B640 site. Ground water flow is primarily horizontal and upward in both the unconfined and confined glacial aquifers and discharges into Green Pond Brook.

United States Geological Survey (USGS) flow measurements show that Green Pond Brook is gaining ground water in the flatland area of the valley, south of the project area and that Bear Swamp Brook is losing water to the aquifer. Groundwater contamination has been identified at the Arsenal in a number of areas. Past metal-plating operations and effluent from etching and plating processes have contaminated groundwater resources according to groundwater sampling and analysis conducted at the Arsenal. Additional testing is being conducted on the groundwater resources at the Arsenal.

4.9 Land Use

The Arsenal is part of the Newark, NJ Primary Metropolitan Statistical Area (MSA), which also includes Essex, Sussex, and Union Counties, New Jersey. The Primary MSA, in turn, is part of the New York-Northern New Jersey-Long Island, NY-NJ-CT Consolidated MSA. Morris County covers 469 square miles, with a population density of 913 persons per square mile. Population density is based on the 1994 Morris County Planning Board estimate. While Morris County retains some rural characteristics from its past, it is categorized as urban by the U.S. Census Bureau.

The three jurisdictions nearest the Arsenal are Rockaway Township, Jefferson Township, and the Borough of Wharton. According to the Morris County Planning Board, the majority of the area surrounding the Arsenal is zoned as residential.

Picatinny Arsenal is the headquarters of ARDEC. Multiple functions occur at the Arsenal in support of its missions. The primary functions at the Arsenal are administration, installation support, natural resource and land use management, armament munitions research, development, engineering, design, test and evaluation and limited production, explosives ordinance disposal, life-cycle nuclear munitions management, tenants and reserve and auxiliary training. In addition to the primary functions, there are a number of other support activities performed by the personnel of the Arsenal in the laboratories, offices, production facilities, machine shops, test facilities, and other support buildings and facilities of the Arsenal.

4.10 Transportation, Safety, and Utilities

Picatinny Arsenal is located north of Interstate 80 (I-80), a major east-west artery that traverses northern New Jersey. U.S. Highway 46 closely parallels I-80. The Arsenal's main gate is off of NJ State Road (SR) 15, a north-south artery located at the southwestern end of the Arsenal.

Level-of-Service (LOS) criteria, which include number of lanes, access, type of terrain, heavy vehicle use, and a number of other factors are used to measure roadway traffic-handling capacity. LOS rankings range from A to F, with A being the highest or best ranking and D considered the minimum acceptable level. Most public roadways near the Arsenal operate at LOS D or better. There is a station for the New Jersey Transit Authority rail line at Dover, about 2.5 miles from the Arsenal and bus lines also provide additional public transportation within Morris County. There

are five major roads within the Arsenal, serving the Arsenal's five commuter gates. These roads are Parker Road, Farley Avenue, Main Road, Phipps Road, and Berkshire Hill Road.

Electricity is furnished to the Arsenal by the Public Service Electric and Gas Company of New Jersey via a 230 kV transmission line. The Arsenal power plant furnishes steam heat to the Arsenal. The power plant currently uses natural gas to produce the steam heat.

The Arsenal obtains its water supply from three wells adjacent to Picatinny Lake. The average daily output of potable water is 600,000 gallons per day (gpd). This average daily use per person is about 70 gpd compared to 75 gpd average for New Jersey, and 78 gpd for the United States.

The Arsenal's wastewater treatment plant is a secondary anaerobic treatment plant with a processing capacity of approximately 400,000 gpd. The waste influent first goes to settling tanks. The sludge from the settling tanks is then hauled off-post by a contractor. After settling, the wastewater travels through the fixed trickling filter and clarifier, is chlorinated, and then dechlorinated. The final effluent is discharged to Green Pond Brook.

The ARDEC has a service contract with Rockaway Valley Regional Sewerage Authority (RVRSA) to process up to 500,000 gpd of sewage at their treatment plant. In preparation for this hookup, the U.S. Army Corps of Engineers installed a pumping station with distribution lines. There is currently 300,000 gpd of sewage from the Arsenal being treated at RVRSA.

Municipal waste (non-hazardous) generated at the Arsenal (i.e. residential, garbage, office wastes, non-hazardous sludges, etc.) is collected by a licensed waste contractor and disposed of at a state-permitted municipal waste disposal facility.

4.11 Cultural and Historic Resources

Picatinny Arsenal contains archaeological remains of prehistoric Native American site activities and historic settlement and industries, as well as significant architectural properties related to its use as a powder depot, arsenal, and weapons and rocket testing facility. The history of Picatinny and the function and significance of the structures on the property have been well documented. Several studies have been conducted regarding the sensitivity for archaeological resources on the property and some areas have been intensively surveyed, leading to the identification of archaeological sites and refinement of sensitivity models.

4.11.1 Archaeological Resources

A Phase I archaeological survey was undertaken in 1998 to evaluate and refine existing sensitivity models and resulted in the first well-documented prehistoric sites within the boundaries of the Arsenal. Fifty-five areas that were considered to be archaeologically sensitive were field inspected and subsurface testing (Phase IB surveys) was conducted within eight of these areas, totaling 107 acres, which were considered to have high potential. A total of 932 shovel tests were excavated during the Phase IB survey, leading to the identification of 11 prehistoric and two historic archaeological sites. The prehistoric sites are typically lithic scatters with few tools and no temporally diagnostic artifacts. The historic archaeological sites consisted of domestic refuse with no apparent structural features. As a result of the study, seven of the 55 Sensitivity Areas were considered to have low archaeological potential based on the degree of soil disturbed or having slopes greater than 15 percent; the remaining 48 Sensitivity Areas are still considered to have some potential to contain intact cultural resources (USACE 2003).

Based on the results of the Phase IB surveys, the archaeological sensitivity model was refined. Presently the B640 site is located within an archaeologically sensitive area. Figure 4-5 depicts the location of the site and the archaeologically sensitive area.

4.11.2 Historic Resources

The Master Plan for the ARDEC recommended seven historic properties for inclusion in the New Jersey Register of Historic Places based on criteria for National Register eligibility (U.S. Army Corps of Engineers, Lev Zetlin Associates 1992; U.S. Army Corps of Engineers, Schieppati *et al.* 1998). These are: (1) the Cannon Gates, at one time the arsenal's main entry; (2) the Walton Family cemetery, which may date to the Revolutionary War and contains graves of former Hessian prisoners-of-war; (3) the Middle Forge; (4) the Middle Forge Memorial, which contains a display of eighteenth-century ironworking tools; (5) the ARDEC Commander's House, built 1911; (6) the Naval Commander's House, built 1890; and (7) the Fire House, built 1903.

An architectural assessment was prepared for 500 historic structures at Picatinny Arsenal based on descriptions and dates of construction presented in an *Evaluation of Structures Built Prior to 1946 at Picatinny Arsenal* (Harrell 1994). More recently, a reevaluation of the 500 structures was performed, with 443 structures determined to be ineligible for the National Register of Historic Places (NRHP); of the remaining 57 structures, 55 are eligible as contributing or noncontributing elements to one of three historic districts (USACE 1999), which the New Jersey Historic Preservation Office has concurred are eligible for the NRHP.

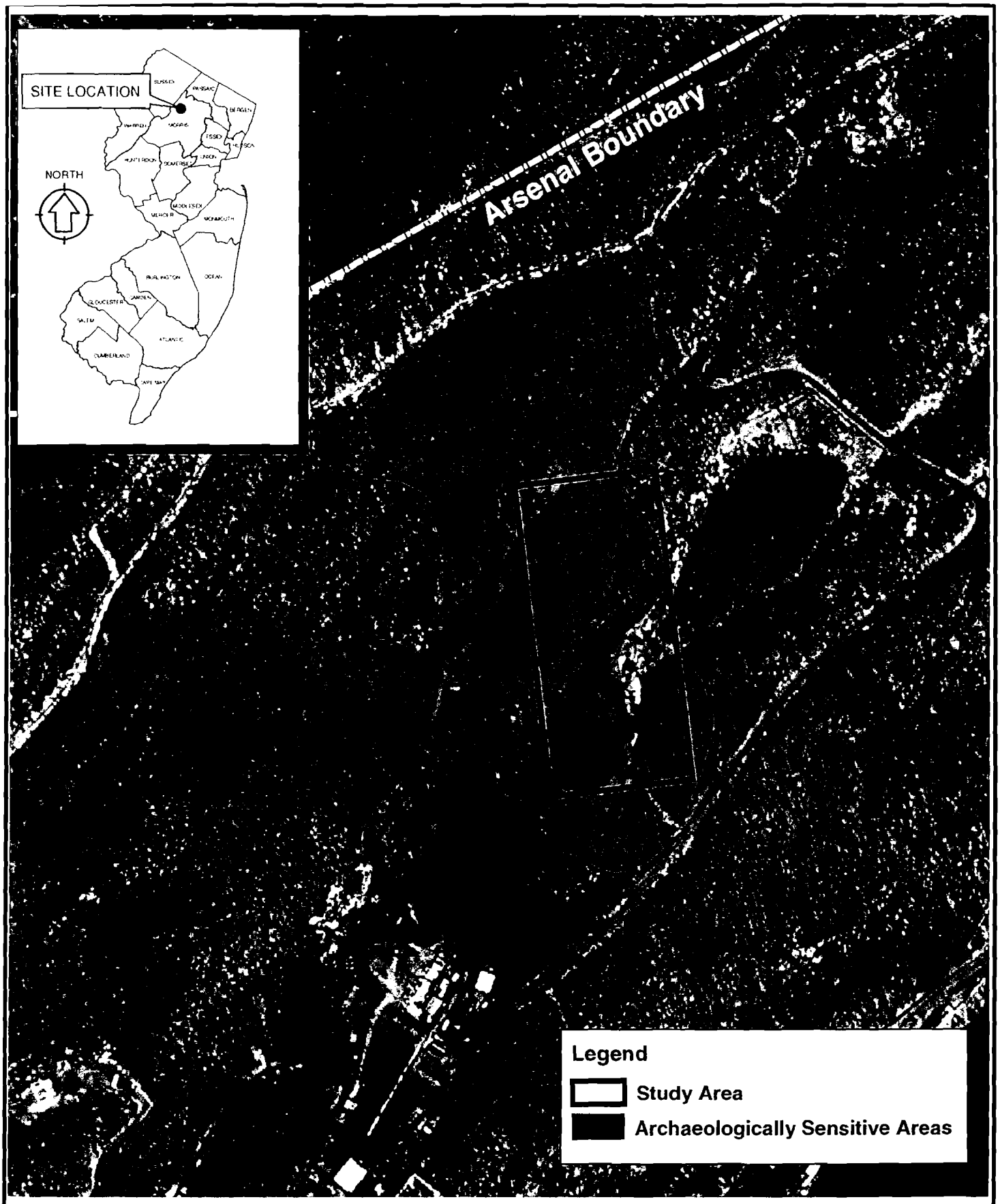
The B640 site is located within boundaries of Historic District 2, the 600 Ordnance Testing Area District. This District includes 25 structures that are eligible for NRHP listing, three of which are considered non-contributing. Ordnance testing was moved to this location on a plateau west of Picatinny Peak following the 1926 explosion. With the exception of the Shipping and Receiving building (621B) constructed in 1914, all of the contributing buildings in this district were erected between 1928 and 1942 and were specifically designed to withstand shock and blast effects from the testing of explosives (Nolte and Steinback 1998b:91-94).

Based on a review of the current ARDEC Building Review list, the bunker at the B640 site is considered to be potentially eligible for listing on the NRHP based on its use during the Cold War.

4.12 Hazardous Waste and Known Contaminated Areas

4.12.1 Hazardous Waste/Materials

Picatinny Arsenal receives, produces, and stores hazardous materials during the course of daily operations and activities that include: text, repair, production and operation, and maintenance activities. The materials used include solvents, cleaning materials, pesticides, herbicides, fuels, oils, lubricants, and explosives. The Arsenal must abide by numerous federal and state laws and regulations designed to protect both workers and the general public from hazardous waste spills or accidents. Safety training for personnel working with hazardous materials is required, and the installation provides trained spill response teams in the event of accidents.



Source: NJDEP Digital Orthophoto, Dover-NE, 1995/1997.

U.S. Army Corps of Engineers
New York District

DRAFT ENVIRONMENTAL ASSESSMENT
BALLISTIC RAIL GUN SYSTEM
PICATINNY ARSENAL

ARCHAEOLOGICALLY SENSITIVE AREAS

The Louis Berger Group, Inc.
30 Vreeland Road
Florham Park, NJ

FIGURE 4-5

Hazardous materials associated with the Proposed Action consist of the propellant charges that will be brought to the site in limited quantities and stored in the existing bunker; Building 640. These charges will be completely spent during firing and will not general waste material. Hydraulic fluid will be contained within the mechanical systems of the gun in a closed-loop system.

Non-hazardous waste materials generated during the firing process will consist of the following:

- Burst Diaphragms - constructed of aluminum or recyclable material will be replaced after each shot is fired;
- Stopping Piston - constructed of biodegradable plastic will be released from the end of the barrel after each shot is fired; and
- Water - will be released from the end of the barrel after each shot is fired. This water will contain an environmentally safe anti-freeze solution.

4.12.2 Known Contaminated Areas

There are 175 remedial investigation sites at the Arsenal that meet the requirements set forth in the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980. A site investigation of 33 sites at the Arsenal was performed in 1989 to identify sources of contamination (Dames & Moore 1989). The B640 site was included in the investigation due to the historic use of the site as a static test range and the potential for the disposal of shell casings and other materials within the range. The investigation focused on the area immediately surrounding the existing test facility and extending northward through and around the off-site wetland area. The limits of the site investigation are shown in Figure 4-6. The results of this investigation indicated that surface water, shallow groundwater and sediments did not appear to be contaminated. Elevated levels of beryllium and sulfate were found within surface water samples within the wetland area. The source for beryllium and sulfate could be due to naturally occurring sources for these constituents rather than contamination. No explosives were detected in surface water or sediments.

A subsequent risk assessment for the testing ranges at Picatinny Arsenal was performed in 1998. The Powder Gymnasticator at the B640 site was included in this assessment. One surface soil sample and one subsurface soil sample were collected immediately adjacent to the end of the barrel where the explosive charge is placed. The subsurface sample was collected from approximately 3 feet below the surface and analyzed for inorganic compounds (metals) and explosives. Table 4-5 lists the compounds detected and the maximum concentration of each.

An exposure assessment was conducted based on personnel using the site only 40 times each year (exposure frequency). Risk was quantified for all of the compounds detected for intake through ingestion, inhalation, and dermal absorption. In summary, the exposure assessment indicated that adverse health effects would not be expected in workers using the site under the conditions evaluated in the exposure assessment.

A site investigation was performed in November 2003 to screen the site for any obvious signs of potential contamination, such as stockpiled wastes, drums, or staining on the ground surface. Except for the presence of the existing facilities addressed in the previous investigations, no obvious signs of contamination were observed.

Source: NJDEP Digital Orthophoto, Dover-NE, 1995/1997.

U.S. Army Corps of Engineers
New York District

DRAFT ENVIRONMENTAL ASSESSMENT
BALLISTIC RAIL GUN SYSTEM
PICATINNY ARSENAL

HAZARDOUS WASTE SITE INVESTIGATION AREA

The Louis Berger Group, Inc.
30 Vreeland Road
Florham Park, NJ

FIGURE 4-6

TABLE 4-5 - MAXIMUM SOIL CONCENTRATIONS

Analyte	Maximum Concentration
Aluminum	3900 mg/kg
Arsenic	3 mg/kg
Barium	20 mg/kg
Cadmium	4.8 mg/kg
Chromium	8.6 mg/kg
Copper	14 mg/kg
Iron	9300 mg/kg
Lead	540 mg/kg
2,6 DNT	3 ug/kg
2,4 DNT	48 ug/kg

Based solely on the limited data points collected for this assessment, as well as the concentrations being below any applicable NJDEP Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC), the soil is not expected to be a concern when constructing the new rail gun system adjacent to and west of the soil sampling location.

5.0 IMPACTS AND MITIGATION

5.1 Physiography and Soils

Impacts to existing soil conditions at the project site would occur during the construction phase due to clearing, excavation, grading and other site preparation activities. No significant adverse impacts are expected as a result of the construction and operation of the proposed facility. A soil erosion and sediment control plan, subject to review and approval by the Morris County Soil Conservation District, will be developed and implemented during construction to minimize the amount of soil loss. No adverse impacts are anticipated.

5.2 Floodplains and Surface Waters

No surface waters or floodplains are present on or in the immediate vicinity of the proposed site and therefore no impacts are anticipated. Site grading and post-construction landscaping would include establishing grades that will promote natural site drainage. Existing paved access roads will be used and the only new impervious area will be associated with a small 8-car parking lot. Because the majority of the site will not be paved but rather consist primarily of permeable gravel and grass turf, additional surface runoff from the proposed facility is expected to be negligible.

5.3 Wildlife and Habitat

Construction of the proposed facility will require the disturbance of approximately 1.3 hectares (3.2 acres) of existing mixed oak forest and previously disturbed areas (Figure 2-2). The habitats on site are utilized by a variety of wildlife species typical of the Highland Region of New Jersey. The loss of upland forest will force most forest dwelling species to utilize other forested areas which are abundant on the Arsenal. Other species will benefit from the increase in habitat edge that will be created.

The majority of the site will be used for the five proposed rail guns. The rail guns will be mounted on five parallel steel rails, supported by concrete piers and elevated three (3) meters (10 feet) above a mixed gravel and turf ground cover. An access path will be provided between each tube. Wildlife will still have access to these areas for foraging and movement while the guns are not being used.

The loss of upland forest and conversion to another open cover type is not anticipated to have a significant impact to wildlife and habitat. Restricting the timing of forest clearing outside of the breeding period for forest dwelling bird species will minimize the potential impact of the Proposed Action to these species.

Felled trees will be salvaged and stored in the fuelwood storage site (all wood limbs, boles over 6 inches in diameter). If for any reason the project cannot be completed following disturbance of the upland forest, measures will be taken to manage the site to preclude colonization by invasive species. Such measures may include restoring the site through the installation of tree species at a density necessary to re-establish standing cover type or monitoring the cleared site for invasive colonization and implementing techniques, if necessary, to manage invasives until forested cover is re-established through natural regeneration.

5.4 Threatened and Endangered Species

The habitat present within the project area provides suitable foraging and resting habitat for the federal and state listed (endangered) Indiana bat, the state listed (threatened) Cooper's hawk, and the state listed (endangered) timber rattlesnake. The construction of the proposed facility will result in the conversion of upland forest to a less desirable cover type (gravel and grass turf) for these species. However, similar upland forest is abundant within the 600 Area of the Arsenal. While the potential exists for each of these species to utilize the habitat on the B640 site, the existing forest habitat does not represent critical habitat for these species. The majority of the site will remain open and available to these species for hunting and movement to other habitats. There are no known hibernacula for the Indiana bat or timber rattlesnake within the vicinity of the site. The Cooper's hawk is not known to nest in this area (Van de Venter, per. comm.).

Potential impacts to the these species will be minimized by restricting the timing of forest clearing to between November 15 and April 1 when these species are either hibernating (Indiana bat and timber rattlesnake) or not actively breeding (Cooper's hawk). In addition, the construction workers will be instructed to notify the Natural Resources Manager if a timber rattlesnake is encountered. The Natural Resources Manager will then remove the snake to a safe location.

None of these species are likely to be adversely affected by the Proposed Action.

5.5 Air Quality

Air quality within the B640 site and the immediate vicinity will not be impacted over the long term by the construction or operation of the new facility. Short term air quality may be affected mainly during construction. Construction activities such as excavating, grading, building and general vehicle movements would increase particulate matter in the form of dust. Also, there will be a relatively small increase in gases, noxious odors and smoke from vehicles and construction equipment.

The Arsenal is designated by the USEPA as a Particulate Matter Attainment Area (PM-10) and general dust control measures are not mandatory or federally required. Yet, a number of measures can be implemented to minimize or eliminate the amount of dust and particulates generated from construction. Some of the steps that can be taken to control particulates include wetting exposed earth, or using dust palliatives or spray-on adhesives as effective dust control measures, if required. Wheel washing devices can be used when construction vehicles enter public roads from the construction area. Loaded material taken from the construction area should be covered to avoid spillage and reduce the possibility of dust being blown from the carrier vehicle. These measures are typically required in construction contract documents, either as standards or special provisions.

Construction of the proposed project will cause minimal, temporary degradation of the ambient air quality within the immediate construction area from soil and gravel dust (particulates). There would also be a temporary increase of construction vehicles and equipment during this phase. Vehicle exhaust and gaseous emissions from the engines of construction equipment and internal combustion engines would cause temporary, localized changes in ambient levels of particulate matter, and an increase in nitrogen oxides, carbon monoxides, and volatile organic compounds. These changes, as well as the increase in hydrocarbon emissions from required paving, would be

temporary and insignificant. Air pollution controls, such as watering down disturbed soil and gravel dust would be implemented as necessary to minimize construction impacts to air quality.

Air emissions resulting from the discharge of propellants are expected to be minimal and similar to the existing 636 Large Caliber Testing Facility, but will be evaluated by the Arsenal prior to the construction of the SRS project.

5.6 Noise

During the construction of the proposed project there will be an increase in noise levels from construction equipment. These impacts would only be temporary and would be limited to daylight hours to limit potential noise impacts. However, there are no residences or other sensitive receptors in the vicinity of the site. There are some steps can be taken to control the noise generated by the construction of the facility. All construction equipment powered by an internal combustion engine will be equipped with a properly maintained muffler. Air compressors will meet current ARDEC noise emissions standards (if required). Air powered equipment will be fitted with pneumatic exhaust silencers. Stationary equipment powered by an internal combustion engine will not be operated within 150 feet of noise sensitive areas (e.g. on-base residences or other sensitive areas) without portable noise barriers placed between the equipment and the noise sensitive areas. To minimize the duration of high noise levels, construction operations that produce high noise levels should be scheduled, whenever possible, to coincide with each other.

The use of the proposed Soft Recovery System will result in an increase in impulse noise levels in the vicinity of the B640 site. When operational, the largest caliber size source impulse noise levels will be approximately 180 decibels (db). The frequency of use for this facility is anticipated to be no more than 200 times annually for all gun caliper sizes. Noise levels decrease rapidly with increasing distance. Intervening forest and hill slopes, present around the B640 site, assist in further attenuating noise levels.

Noise levels from similar tests fall below both State and Federal limits at the Arsenal property boundaries. Similar gun firings are conducted at the B636 range, located approximately 0.3 kilometers (¼ mile) from the proposed site. Extensive evaluations have been conducted to monitor the noise levels generated from these gun firings in relation to the Installation Compatible Use Zone (ICUZ) maps. All noise levels fell within prescribed limits before leaving the Arsenal boundary. Since the noise levels generated from the Soft Recovery System are similar to the B636 gun firings, it is expected the noise levels will also fall within the ICUZ limits and a significant change in noise levels will not occur as a result of implementation of the Proposed Action.

5.7 Groundwater

The Proposed Action will have no significant impacts on groundwater quality from construction or operation of the new system. The facility will not generate significant stormwater runoff from the site and will not affect the water quality of any major groundwater supply areas.

5.8 Land Use

Since Picatinny Arsenal is owned by the federal government, Morris County has no regulatory jurisdiction over any activity at the installation. The construction of the Soft Recovery System will not have a substantial impact on the adjacent land uses within or outside the Arsenal. The Proposed Action conforms with Picatinny Arsenal's Master Plan.

No recreational land will be affected by the Proposed Action.

5.9 Transportation, Safety, and Utilities

The Proposed Action will not generate additional traffic on public roads or alter traffic patterns within the base. Traffic activity would be transferred from the present rail gun facility to the B640 site. The facility will have access to existing electric and water service available along Bear Swamp Road.

Proper fire and smoke alarm systems, HVAC systems, outdoor lighting, signs and markings for the Soft Recovery System will be incorporated into the facility. Previous conventional fire suppression systems have utilized Halon in cases in which computer functioning was of concern. However, such a fire suppression system emits chlorofluorocarbons, and should not be utilized in the design if possible. Decisions regarding the fire suppression method will be made at the 100% design stage. The facility will maintain a file of Material Safety Data Sheets (MSDS) for any industrial materials to be used at the facility.

5.10 Cultural and Historic Resources

The existing bunker on the B640 site is potentially eligible for listing as a historic structure. Prior to the completion of the design plans, the status of the building will be determined. If the bunker is eligible for listing as a historic structure, the facility design will incorporate a prefabricated structure to serve as the bunker/instrumentation shed and avoid any disturbance to the existing bunker.

Based on model projections, the majority of the B640 site is located within an archaeological sensitive area. A Phase 1B survey of the study area will be conducted following the felling of trees to determine if any significant artifacts are present in the study area. Felled trees will remain on site until after the Phase 1B survey is completed. If artifacts are found within a portion of the site, the placement of the rail guns may be shifted to avoid any disturbance to these areas. If disturbance of any artifacts can not be avoided, RDECOM-ARDEC will consult with NJ Historic Preservation Office to determine the significance of the material found and if a Phase II investigation is required.

At this time it is anticipated that significant impacts to cultural resources will be avoided by the Proposed Action. If impacts are identified as a result of the Phase IB survey, RDECOM-ARDEC will consult with the NJ Historic Preservation Office on the appropriate method to mitigate these impacts.

5.11 Hazardous Waste and Known Contaminated Areas

Hazardous materials consist of the propellant charges that will be brought to the site in limited quantities and stored in the existing bunker; Building 640. These charges will be completely spent during firing and will not general waste material. Hydraulic fluid will be contained within the mechanical systems of the gun in a closed-loop system.

Non-hazardous waste materials will be generated during the firing process from burst diaphragms and stopping pistons. However, the Proposed Action is not anticipated to result in the accumulation of non-hazardous waste materials, as waste will be properly disposed.

Based solely on the results of the previous hazardous waste site investigation and subsequent risk assessment based on the limited data points, it is apparent that the B640 site does not exhibit significant levels of contamination. Concentrations appear to be below any applicable NJDEP Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC). Therefore, the soil is not expected to be a concern when constructing the new rail gun system adjacent to and west of the soil sampling location.

Soil samples taken from the existing Rail Gun site (Area 3620) have not detected any explosives or explosive compositions with the soil and it is not expected that the new Rail Guns will introduce any explosives to the soil in the B640 area.

The Proposed Action is not anticipated to result in the contamination of the site or affect known contaminated areas.

6.0 SUMMARY OF IMPACTS

All elements of the Proposed Action have been evaluated to identify expected or potential environmental effects. No significant adverse environmental impacts have been identified, nor have conflicts with land use, policies or controls been observed, as confirmed by the Public Works Directorate of the Arsenal.

Physiography and Soils: No significant adverse impacts are anticipated as a result of the construction and operation of the proposed facility. A soil erosion and sediment control plan, subject to review and approval by the Morris County Soil Conservation District, will be developed and implemented during construction to minimize the amount of soil loss.

Floodplains and Surface Waters: No surface waters or floodplains are present on or in the immediate vicinity of the proposed site and therefore no impacts are anticipated. Site grading and post-construction landscaping will promote natural site drainage. New impervious area is limited to an 8-car parking lot. Due to permeability of gravel and grass turf, surface runoff will be negligible.

Wildlife and Habitat: Approximately 1.3 hectares (3.2 acres) of existing mixed oak forest and previously disturbed areas will be impacted by construction of the Proposed Action. The loss of upland forest will force most forest dwelling species to utilize other forested areas on the Arsenal. Habitat edge will be created. Wildlife will still have access to the location of the Proposed Action for foraging and movement while the guns are not being used. The loss of upland forest and conversion to another open cover type is not anticipated to have a significant impact to wildlife and habitat. Clearing of trees will be conducted outside of the breeding period for forest dwelling bird species to minimize the potential impact.

Threatened and Endangered Species: The habitat present within the project area does not represent critical habitat for the federal and state listed Indiana bat, the state listed Cooper's hawk, or the state listed timber rattlesnake. The majority of the site will remain open and available to these species for hunting and movement to other habitats. Potential impacts will be minimized by restricting the timing of forest clearing to between November 15 and April 1. Construction workers will be instructed to notify the Natural Resources Manager if a timber rattlesnake is encountered. None of these species are likely to be adversely affected by the Proposed Action.

Air Quality: Air quality within the B640 site and the immediate vicinity will not be impacted by the construction or operation of the Proposed Action. Short term air quality may be affected due to an increase in particulate matter, gases, noxious odors, or smoke from vehicles and construction equipment. Measures will be implemented, including wetting exposed earth, using dust palliatives, or spray-on adhesives, to minimize or eliminate the amount of dust and particulates generated from construction. Vehicle exhaust and gaseous emissions from the engines of construction equipment and internal combustion engines would cause temporary, localized changes in ambient levels of particulate matter, and an increase in nitrogen oxides, carbon monoxides, and volatile organic compounds. These changes will be temporary and insignificant. The operation of the Proposed Action will have minimal impacts on air quality.

Noise: An increase in noise levels is anticipated during construction. These impacts would be limited and temporary. No residences or sensitive receptors exist near the site. The operation of the Proposed Action will result in an increase in impulse noise levels. Adjacent forest and hill slopes will significantly attenuate noise levels. Tests indicate noise levels from similar operations fall below both State and Federal limits before leaving the Arsenal property boundaries. It is expected the noise levels will fall within the ICUZ limits and a significant change in noise levels will not occur.

Groundwater: The Proposed Action will have no significant impacts on groundwater quality from construction or operation of the new system. The facility will not generate significant stormwater runoff and will not affect the water quality of any major groundwater supply areas.

Land Use: The construction of the Proposed Action will not have an impact on adjacent land uses within or outside the Arsenal. The proposed action conforms with Picatinny Arsenal's Master Plan.

Transportation, Safety, and Utilities: The proposed project will not generate additional traffic on public roads or alter traffic patterns within the base. The B640 Site was selected as the preferred alternative since it meets Arsenal safety requirements; test firings will be conducted in a remote location. Proper fire and smoke alarm systems, HVAC systems, outdoor lighting, signs and markings for the Soft Recovery System will be included.

Cultural and Historic Resources: The majority of the B640 site is located within an archaeological sensitive area. A Phase 1B survey of the study area will be conducted and if necessary, the alignment of the guns will be modified to avoid impact. If disturbance cannot be avoided, the NJ Historic Preservation Office will be consulted to discuss possible mitigation options.

The existing bunker on the B640 site is potentially eligible for listing as a historic structure. The status of the bunker will be determined. If eligible for listing as a historic structure, the facility design will incorporate a prefabricated structure to serve as the bunker/instrumentation shed and avoid any disturbance to the existing bunker. It is anticipated that the Proposed Action will not have a significant impact on cultural resources.

Hazardous Waste and Known Contaminated Areas: Non-hazardous wastes generated by the Proposed Action will be properly disposed. The B640 site does not exhibit significant levels of contamination and the Proposed Action is not expected to introduce any explosives into the soil.

For these reasons, it is the conclusion of this EA that the Proposed Action will not have a significant impact on the environment and an Environmental Impact Statement will not be prepared.

7.0 REGULATORY PERMITS AND APPROVALS

The following regulatory permits and approvals may be required for the construction of the Soft Recovery System:

- Notification or permitting is required for sanitary sewer discharge. The Rockaway Valley Regional Sewerage Authority is the governing body;

- Soil Erosion and Sediment Control Plan will be submitted to the Morris County Soil Conservation District for approval;

- A Request for Authorization (RFA) for stormwater associated with construction is also required for areas of disturbance greater than one (1) acre (as of March 1, 2004). This RFA is prepared and submitted with the Soil Erosion and Sediment Control Plan;

- If freshwater wetland transition areas will be disturbed by construction activities, a permit will be required pursuant to the NJDEP Freshwater Wetland Act Rules (7:7A).

8.0 LIST OF AGENCIES AND ORGANIZATIONS CONSULTED

The following agencies, organizations, and personnel were consulted during the preparation of this Environmental Assessment:

Vinod Kapor	- Directorate, Public Works, RDECOM-ARDEC
Jon Van De Venter	- Natural Resource Manager, Directorate, Public Works, RDECOM-ARDEC
Kelly Ridgel	- Environmental Specialist, JCI - Directorate, Public Works, RDECOM-ARDEC
Herbert A. Lord	- NJDEP, Natural Heritage Program
Lisa Solberg	- U.S. Fish and Wildlife Service

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